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MONTHLY REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR

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MONTHLY REPORT.

DEPARTMENT OF AGRICULTURE,
Statistical Division, September 23, 1872.

SIR: I report herewith, for publication, statements of the condition of farm crops, as shown in the returns for August and September, and statistics of market movements and prices, together with other matter representing the work of the several divisions of the Department of Agriculture.

Respectfully,

J. R. DODGE,
Statistician.

Hon. F. WATTS, *Commissioner.*

CONDITION OF THE CROPS.

CORN.

The condition of corn is better than for several previous seasons, throughout New England. The unusually warm weather, in connection with seasonable rains, which have kept green even the sandy plains of the coast section, has given high promise of a large yield, which early frosts can now scarcely impair. The Maine and Connecticut averages are 7 above; New Hampshire, 6; Rhode Island, 5; and Vermont, 2.

The average of condition in New York is 110, the best reports coming from the principal corn-producing counties, of which Livingston returns 125; Onondaga and Ontario 120; Wayne, 115; Dutchess, 110; and Suffolk and other large counties, 100.

The counties of Hunterdon, Monmouth, Salem, Warren, Morris, and Mercer, in New Jersey, yielding more than half the corn supply of the State, average 111, but the remaining counties reduce the general average to 110. Salem returns 95, and Atlantic 50; no other returns fall below 100.

In Pennsylvania, such counties as Lancaster, York, Washington, Bucks, Berks, Westmoreland, Cumberland, Centre, Montgomery, and Chester, none of which produce less than a million bushels, and some of them nearly three millions, average together 109, which is also the average for forty-one counties reporting corn.

Delaware, Maryland, and Virginia are the only States between Maine and Georgia which report the corn prospect unfavorable. The average for Delaware is 57, for Maryland 86, and Virginia 95. The reports from Virginia are variable, some "better than for years," as in Bath, while others give expectation of but half a crop. Accomack, which usually produces half a million bushels, returns condition at 110, while Fauquier, which stands second in corn production, makes its record 90.

North Carolina guarantees a large crop of corn. Only Edgecombe and Jones report low condition, ten counties average, and thirty-seven above, the average for the State being 112.

In South Carolina only four counties report less than 100, and the State average is 106.

In Georgia, where the average is 108, some of the larger corn counties make even more favorable returns.

In Alabama, Wilcox reports 150; Lawrence, 125; Dallas, 115; Montgomery, 110. These are among the heaviest corn-producers. Only three counties report low condition. Average, 107.

A large yield is promised in Mississippi, Louisiana, and Texas. Arkansas promises an average, and Tennessee 5 per cent. above.

In Kentucky, among counties usually producing over a million bushels each, Shelby is placed at 120; Jefferson, 110; and Fayette, 100. Only two are below average.

In Ohio, of forty-three counties reporting, only two are below average, seven average, and thirty-four above. Of sixteen counties, which produced twenty-three millions of bushels in 1869, Franklin and Warren report 125; Darke, 120; Coshocton, 115; Clinton, Miami, and Highland, 110; Licking and Fairfield, 100; and Montgomery, Ross, Fayette, Butler, Champaign, and Hamilton, 105.

From many of the principal counties in Michigan, including Jackson, Calhoun, Saint Joseph, Livingston, Branch, and Washtenaw, returns of 100 are made, while Oakland returns 95, and Hillsdale 80; the average for the State being 99.

Among the Indiana counties producing more than a million bushels each, Madison reports 125 for condition; Marion and Wayne, 110; Bartholemew, 108; Shelby, 105. The State average is 105.

Of fifty counties reporting in Illinois, thirty-two report high condition, seven low, and eleven average. Among those usually growing from two to six millions of bushels each, the following returns are made: Sangamon, 115; McLean, Mason, Macon, Tazewell, 110; Madison, 100; Champaign, 90. The general average is 107.

Wisconsin, like Michigan, falls a little below 100. La Fayette, second county in production in 1869, returns 120; Rock, 125; Iowa and Richland, 100; Green, 95; Fond du Lac, 85; Jefferson and Columbia, 80. In this State and Minnesota the average is the same, 98.

In Iowa the counties producing not less than a million bushels each, average 103, while the average for the State is 104.

The following counties in Missouri, which produce from one to two millions of bushels each, average 112, viz, Clay, Cass, La Fayette, Holt, Platte, Jackson, Nodaway, Boone, and Saint Louis; Cass and Saint Louis being placed at 100, and Nodaway at 125. The State average is 110.

In Kansas, Doniphan, the first in corn production, is reported at 110, as also are Atchison, Johnson, Bourbon, Miami, Shawnee, and Marshall; Brown and Pottawattamie, 125; Cherokee, 130; Linn, 120; Nemaha, 115; Jefferson and Coffey, 110. The State average is 112. Nebraska averages 111; California, 103; Oregon, 101.

The following is a classification of the September returns of corn:

States.	Average.	Above average.	Below average.	Total number of counties reporting.
Maine	4	6	.....	10
New Hampshire	2	5	.....	7
Vermont	6	4	.....	10
Massachusetts	3	4	.....	7
Rhode Island	1	1	.....	2
Connecticut	2	4	.....	6
New York	6	23	3	32
New Jersey	.....	10	2	12
Pennsylvania	6	33	2	41
Delaware	.....	.....	2	2
Maryland	2	1	8	11
Virginia	10	12	23	45
North Carolina	10	37	2	49
South Carolina	4	10	4	18
Georgia	15	26	9	50
Florida	3	2	10	15
Alabama	12	16	3	31
Mississippi	7	22	1	30
Louisiana	5	14	1	20
Texas	6	23	3	32
Arkansas	3	5	7	15
Tennessee	7	29	12	48
West Virginia	8	11	4	23
Kentucky	3	31	2	36
Ohio	7	34	2	43
Michigan	13	6	8	27
Indiana	12	25	10	47
Illinois	11	32	7	50
Wisconsin	5	5	12	22
Minnesota	6	4	5	15
Iowa	11	21	8	40
Missouri	9	37	8	54
Kansas	8	23	1	32
Nebraska	3	7	1	11
California	7	6	2	15
Oregon	7	1	1	9
Total	224	530	163	917

COTTON.

The county reports of the condition of cotton are less favorable in September than were the returns made in the earlier part of the season. Vigorous growth, stimulated by fertilizers and sufficient moisture, characterized the fields of the Atlantic States up to the season of the first picking, and gave promise of unusual fruitfulness. The plants were in many fields too stocky and succulent to withstand well the recent local droughts or to endure the draughts upon vitality consequent upon the maturing of their heavy burden of bolls, causing forms to drop and young bolls to wither. In exposed bottom lands, where sudden and heavy rains occurred, damage by flooding resulted. While a few reports allude to the presence of insects injurious to cotton, losses from that cause, in all the States east and north of Alabama, are less than usual.

Local droughts of considerable severity have prevailed for several

weeks in portions of the territory west of Alabama, while a sufficiency of moisture has been reported of the Atlantic States, and in many places an excess of rain is observed. Eleven meteorological stations, in different parts of North Carolina, show a record of rain-fall in August ranging from 2.60 inches in Granville to 7.80 in Mecklenburgh, and make an average of 5.27 inches. Three reports from South Carolina average 7.15 inches, the lowest rain-fall being in Newberry, where injury was wrought by "heavy rains followed by drought." The average of seven stations of Georgia was 4.18 inches, the lowest record being 2.70 at Fulton, and the highest 6.50 at Washington. The range in Florida was from 2.60 inches in Duval to 23.25 in Wakulla, and the average 8.90. The average of stations reported in other States is as follows: Alabama, 2.75 inches; Mississippi, 2.72 inches; Louisiana, 2.76; Texas, 1.44; Arkansas, 2.76; Tennessee, 3.06 inches, the range being very wide, 1.33 in Montgomery to 6.01 inches in Sumner.

The condition of the crop, as shown by the returns received in September, in comparison with those of August, is as follows:

	September.	August.
Virginia	97	101
North Carolina	101	99
South Carolina	95	98
Georgia	96	104
Florida	92	96
Alabama	88	107
Mississippi	90	112
Louisiana	86	101
Texas	94	103
Arkansas	78	96
Tennessee	92	104

Thus the prospect throughout the entire cotton area, which favored a yield 5 per cent. larger than an average product, promises at the present time about 9 per cent. less than an average. The increase of area over last year, and the unfavorable character of the season of 1871, still point to a material increase in the total crop of 1872, while the possible extension of insect ravages, or the early occurrence of frost, may modify the present expectation.

The only counties reporting cotton in Virginia, are Northampton, Southampton, King and Queen, Chesterfield, Greenville, and Patrick; and in these the average of condition has declined from 101 in August to 97 in September.

Returns from thirty-eight counties in North Carolina average 101 in September, against 97 in August. Mecklenburgh holds its August estimate of 125, and Edgecombe has advanced from 75 to 100. Twelve reports are below 100. No material loss from insects is reported.

The average condition in South Carolina has fallen from 98 in August to 95 in September. Darlington, Barnwell, Edgefield, and Fairfield Counties, which together produced 90,000 bales of the crop of 1869, average 96, Darlington and Fairfield standing better than in August. Richland, reporting 100 in August, has been visited by the caterpillar, which reduces the estimate to 80.

In August only twelve counties in Georgia, of sixty reporting, returned condition less than 100, and the general average was 104; in September it is replaced at 96. Insect ravages are becoming serious in several counties, especially in Lee, Twiggs, Spalding, Schley, Baldwin, and Marion. In Gwinnett the crop is claimed to be better than ever before; that 10,000 bales are expected, 6,000 being deemed a large crop prior to 1860, this prospect being due to good culture and a liberal use

of fertilizers. Georgia is employing fertilizers more extensively in this culture than any other State.

The decline during the past month in Florida has been from 96 to 92. The caterpillar appeared in Suwannee as early as July 15, and divested of leaves whole fields before August 15. Leon, Jefferson, Madison, Gadsden, and Taylor have also been visited. Floods have swept a large area of bottom-lands, and heavy rains elsewhere have caused leaves and forms to fall.

Only four counties in Alabama made returns below 100 in August, the general average being 107; two-thirds of the present returns are below 100, thirty-two counties averaging 88. Of the prominent counties, Hale shows a decline from 110 to 67, Russell from 103 to 97, and Marengo from 90 to 70. Montgomery indicates an advance from 105 to 110. Two-thirds of the returns include a reference to insect ravages.

The general average of Mississippi returns has fallen since the August report from 112 to 90, Warren has declined from 110 to 108, Madison from 105 to 77, Hinds from 100 to 60. Three-fourths of the returns are below 100. Insect depredations are serious in many counties.

The average for Louisiana was 101 in August; in September 86. In Caddo the decline is from 90 to 50, from 100 to 75 in Concordia, from 95 to 80 in Claiborne; while in Madison, a prominent parish, an advance from 120 to 140 is reported. The caterpillar has been destructive in Tangipahoa, Marion, Red River, Saint Landry, and Concordia. In some counties persistent and comparatively successful efforts were made to destroy the early brood of caterpillars; in Wilkinson large numbers were killed, and in Warren both the caterpillar and boll-worm were held in check by the vigilance and industry of planters.

Drought has shortened the Texas crop, and reduced the average of the returns of condition from 103 to 94. Few reports of the presence of insects are received.

The average of Arkansas returns has been decreased from 96 to 78, mainly by dry weather.

In Tennessee, drought has also been injurious, reducing the average from 104 to 92. The forms and young bolls of the top crop are rapidly falling off, threatening a material reduction of the crop.

In presenting the following extracts from notes accompanying the September returns, it should be remembered that the tables present in compact form the spirit and substance of all the returns received, while the extracts are necessarily desultory and exceptional:

North Carolina.—Crop has rapidly improved within thirty days; just commenced opening, and promises a good yield. *Mecklenburgh:* Best crop since the war; a little rust; too much rain; very heavily bolled. *Onslow:* Never finer in growth, though injured by late rains, causing it to shed forms. *Pasquotank:* Poorer than ever known. *Sampson:* Very seriously affected by rust. *Bertie:* Below average; three weeks ago it was 15 per cent. above; rust has proved very destructive; prospect a third less than it was two weeks ago.

South Carolina.—*York:* Growth remarkably rapid, on some farms too rapid, causing the casting of fruit to a considerable extent. The stock is unusually well grown and filled. Two weeks ago the crop promised 25 per cent. above average, but continuous rains during the latter half of August have caused some rot as well as shedding of young fruit. *Clarendon:* Poorer than for forty-seven years; fine up to July 15, when hot drought set in, cutting down the prospect to two-thirds of an average; fruit has fallen to a great extent; only July cotton left; rust has become general. *Marion:* Early cotton damaged by drought; late cotton by rust. *Richland:* Much injured by rust, and in some localities by caterpillars destroying the whole August crop.

Georgia.—*Glasscock:* Great falling off in cotton; rust and rain have shortened it a half from what was expected a month ago; caterpillars and boll-worms on some farms. *Marion:* almost every field suffering from some disaster—caterpillar, boll-worm, or rust—and, in some cases, all three. Late cotton has no matured fruit, but a rank

growth of weed. Even without the assistance of these scourges the early and late cotton both suffered severely from unusual shedding of bolls, and from extremes of hot and dry weather. *Calhoun:* Injured a third by wet weather and caterpillars. *Columbia:* Crop shortened by overgrowth and casting of fruit. *Lee:* Caterpillar has entirely stripped some fields and threatens to sweep the whole; crop probably 75 per cent. below average. *Floyd:* Caterpillars have just made their appearance, otherwise the crop is very promising. *Twiggs:* Within twenty days a fine prospect of cotton has been reduced 20 per cent. below average. *Fulton:* Best crop ever known, opening finely. *Coweta:* Suffering from caterpillars and blight, besides rust; prospect very gloomy. *Spalding:* Worm and rust doing great damage. *Schley:* Caterpillars sweeping whole fields in forty-eight hours. *Baldwin:* Badly damaged by drought and caterpillars; September cotton will be cut off.

FLORIDA.—*Suwannee:* Caterpillars appeared July 15, and ate up some fields clean by August 15; September 15 the crop will probably be swept; long and short staple cotton will be cut short at least one-half. *Leon:* Caterpillars appeared in force August 18 and by the 25th had stripped cotton of all the leaves, and exposed the fact that there was little or no young fruit, forms, or bolls on the stalks; crop probably not over a third of average. *Jefferson:* Caterpillars and rot have done serious injury to the crop, which probably will not be over half average. *Madison:* The best crop, by far, since the war; caterpillars have not done much damage in this county, as yet. *Gadsden:* Rains heavy and continuous since the last report, making cotton to shed its forms and young bolls, besides causing a great increase of rust, and "black" or "boll" rot. Caterpillars have also done great damage. Late planted cotton will be a failure. *Taylor:* Excessive rains have made the cotton shed its fruit; caterpillars stripped the leaves. Not over a half crop at best; top cotton all lost. Egyptian cotton very fine; but little injured by the caterpillar.

ALABAMA.—*Crenshaw:* Prospects very unfavorable; entire fields denuded of leaves by army-worm, boll-worm, and rust. *Montgomery:* Crop very fine and opening rapidly, but caterpillars are very destructive. *Franklin:* Seriously injured by drought; will probably be not over half crop; half green bolls have fallen off. *Colbert:* Injured by dry hot weather; very few bolls from August growth. *Clarke:* Within ten days the caterpillar has been very destructive; early cotton a half crop; of late cotton many fields usually averaging a bale to the acre will not make over a bale to 10 acres. *Conecuh:* Within ten days the worm has destroyed almost the whole crop. *Russell:* Forward cotton injured by rust; late cotton taken by caterpillars. *Calhoun:* Army-worm within five days has reduced the prospect from average to 25 per cent. below. *Chambers:* Worms doing same mischief. *Butler:* Army-worm doing great mischief; every field bare of leaves. *Macon:* Crops cut short by drought, rust, and worms. *Perry:* Nearly half destroyed by caterpillars. *Dallas:* Caterpillars reduced the crop to nearly 50 per cent. below average. *Pike:* Within ten days army-worms have swept the crop, especially the late planted. *Wilcox:* Freshets and worms have cut down the crops one half. *Tuscaloosa:* Crop greatly reduced by drought and caterpillars. *Limestone:* Cut short a fourth by rust and worms.

MISSISSIPPI.—*Attala:* Fine prospects of the crop existing two weeks ago are seriously compromised by drought and worms. *Pike:* Shortened by drought and army-worm; squares falling. *Lauderdale:* Fine prospects up to August 10, when the drought cut the crop short. Crops of last year 4,000 bales; this year not over 3,000. *Jasper:* Cotton-worm at work. *Newton:* Crop doing well. *Noxubee:* Crop a failure, especially late cotton. *Wayne:* Alarm about caterpillars subsiding; these worms will shorten the crop very considerably. *Coahoma:* Drought has cut down the crop 25 per cent. *Hinds:* Crop half cut off by drought and worms. *Lee:* Reduced 50 per cent. by drought. *Madison:* Prospect reduced a third within a month. *Clark:* Unprecedented falling off of the crop since July 25 through drought and caterpillars; there will be no top crop; the greater portion of the crop will be open in September. *Neshoba:* Yield lighter than last year; drought and worms have seriously shortened it. *Yalabusha:* Has failed rapidly of late through drought, blight, and worms; not over a half crop. *Marion:* Worms have swept the crop; yield not over 65 per cent., at most.

LOUISIANA.—*Morehouse:* Half crop; injured by long drought; quality of staple above average. *Caddo:* Drought has reduced the crop 50 per centum below average. *Franklin:* Ruined. *Madison:* Fine. *East Feliciana:* Crop decreased a third by drought and worms in August. *Iberia:* Bolls and forms shedding freely through drought. *Claiborne:* Blasted by drought. *Tangipahoa:* Fearfully injured by drought; caterpillar taking what is left; perhaps half a crop will be gathered. *Saint Landry:* Probably reduced to a half crop by long drought and army-worms. *Red River:* Shortened 10 per centum during August by drought and army-worms. *Richland:* Reduced to a half crop by drought. *Bossier:* Shortened a half by drought. *Concordia:* Caterpillars have swept many plantations; in many fields not a leaf has been left; damage worse along the river than in the interior. *Rapides:* Stripped of all foliage between 15th and 20th August; cannot yield over one-third of an average.

TEXAS.—*Coryell:* Drought has cut down the crop to a half average. *Kaufman:* Throwing off on account of rain; worms have done a little damage. *Red River*: Suffering for rain. *Dallas:* Will average not over 600 pounds of seed cotton per acre, or 200 pounds of lint; July prospects reduced a third. *Ellis:* Drought shortening the crop again. *Henderson:* Crop ruined by drouth—average not greater than last year—35. *Williamson:* Drought has shortened cotton a third. *Milam:* Upland cotton shortened by drought one third; bottom crops shortened one-fourth; opened prematurely. *Gonzales:* Low condition; drought has caused squares and small bolls to fall; worms have done some damage. *Austin*: Scarcely average owing to drought. *Johnson:* Dry weather shortening cotton crop, yet it will be double of last year's yield. *Fayette:* Drought has cut down the crop at least a third, yet in river-lands crops well cultivated will produce 500 pounds per acre. Caterpillars have been very troublesome; now stripping all the leaves; early prolific seed mostly used. *Waco:* Yield will not pay three-fourths of the cost of production; worst failure yet known here. *Marion:* Crop almost ruined. *Rusk:* Opened to the top; all the squares dropped off on account of drought.

ARKANSAS.—*Monroe:* Drought causing the squares to fall; crop below average. *Crittenden:* Seriously damaged by drought and rust or blight. *Pulaski:* Shortened by drought 33 per cent. *Prairie:* On uplands cut off three-fourths; short also on bottoms. *Drew:* Crop will be short.

TENNESSEE.—*Madison:* Suffering from drought; squares and bolls dropping; rust in a few fields. *McNairy:* Very promising; average considerably increased. *Hardeman:* Seriously injured by drought and heat. *Weakley:* Drought has reduced the crop one-half. *Giles:* Shedding squares and top bolls; will probably be cut short one-fourth.

WHEAT.

The September returns, which give the condition of wheat when harvested, present the following list of States above average: Maine, 109; North Carolina, 109; South Carolina, 102; Georgia, 104; Alabama, 105; Mississippi, 102; Louisiana, 112; Texas, 120; Arkansas, 106; Tennessee, 116; Kentucky, 110; Minnesota, 104; Nebraska, 109. Those below 100 are New Hampshire, 95; Vermont, 91; Massachusetts, 97; Connecticut, 98; New York, 85; New Jersey, 89; Pennsylvania, 76; Delaware, 92; Maryland, 74; Virginia, 99; West Virginia, 96; Ohio, 84; Michigan, 95; Indiana, 97; Illinois, 95; Wisconsin, 98; Missouri, 70; Kansas, 85; Oregon, 96; Iowa, 100.

Reference is made to the tables for August, in which the condition of spring-wheat in that month is shown.

OATS.

Of the New England States, Maine reports the oat crop 8 per cent., and Connecticut 5 per cent. above average, the other States being about 5 per cent. below. In some parts of Vermont and Massachusetts, excessive rains blighted the crop while growing, and injured it in the shock after harvesting. The same causes reduced the crop below an average in all the Middle States. In Indiana County, Pennsylvania, the loss is stated at 20 per cent. In Warren County, New York, the Birlie oats are pronounced inferior in quality to the common black oats, besides being weaker in straw and smaller in quantity, requiring a longer time to ripen. In Virginia, the depreciation is 25 per cent. The Norway oats made a very fine yield in Frederick County. The Schonen is pronounced the best variety ever tried in Highland County, but an entire failure in Accomack. Here, however, the oat crop has failed for the last ten years. In North Carolina, the crop is 7 per cent. above average; but in all the other Atlantic and Gulf coast States it falls from 2 to 24 per cent. below, except in Texas, which reaches 111. In Travis County, a new variety—the red oats—yielded from 75 to 80 bushels per acre. Arkansas, Tennessee, and Kentucky report from 5 to 7 per cent. above average, and West Virginia 3 per cent. below. The crop was injured in the shock in several counties of these States, by rains

North of the Ohio, Illinois reports an average crop, the other States being from 1 to 9 per cent. below. In Lee County, Illinois, the yield will average about 50 bushels per acre. In Champagne County, the injuries of worms in this crop are noted. West of the Mississippi, the crop was from 4 to 14 per cent. above average, except in Iowa—2 per cent. below, where, in many places, it ripened too rapidly. In California, it was 1 per cent. below. Contra Costa County is said never to fail of a fair crop. In Oregon there was a deficiency of 4 per cent.

BARLEY.

The barley crop is quite deficient. East of the Mississippi, the only States that reach an average are Connecticut, North Carolina, South Carolina, and Alabama, in all of which the average is small. Of the Southwestern States, Texas, Tennessee, and Kentucky are above average, as are, also, Minnesota, Kansas, Nebraska, and Oregon. All the other States are deficient.

TOBACCO.

Of twenty-three States reporting the tobacco crop fifteen are full average or above, viz: Connecticut, 108; New York, 106; Pennsylvania, 102; North Carolina, 105; Georgia, 103; Alabama, 101; Arkansas, 105; Mississippi, Louisiana, Texas, West Virginia, and Kentucky, 100; Illinois, 101; Missouri, 103; Nebraska, 107. The remaining eight States are below average, viz: Massachusetts, 99; Virginia, 91; Tennessee, 91; Ohio, 92; Indiana, 98; Wisconsin, 85; Iowa, 96; Kansas, 96. The crop was injured in some localities by heavy rains, and in others by severe drought. In many cases the crop was highly stimulated by quick fertilizers.

GRASS AND PASTURES.

In the New England and Middle States the hay crop was above average, except in New Jersey, where it was 10 per cent., and in Delaware where it was 45 per cent. below. The fine rains of July and August, in many localities, delayed harvest and caused the crop to be gathered in indifferent condition, but brought up the pastures to an unusual high average. In Delaware the remarkable shortness of the crop is attributed to severe drought. In Maryland and Virginia the same cause cut down the yield 38 and 31 per cent., respectively, below average. In Charles County, Maryland, no crop was harvested. From North Carolina to Florida the crop was above average, but westward to the Mississippi several per cent. below. Louisiana reports 14 per cent. and Texas 4 per cent. above average. In Gonzales County the crop was mostly of millet and mesquite grass, a branch of production which shows considerable increase. Arkansas is 11 per cent. above average, while Tennessee is 3 per cent. below, on account of the drought in some counties shortening timothy and red-top. Kentucky is above average. Ohio and Michigan are, respectively, 18 per cent. and 3 per cent. deficient. All the other Western and Pacific States are above average, the excess ranging from 3 to 14 per cent.

POTATOES.

Rust and rot, resulting from excessive rains, reduced the crop in the Northern New England States, through New Hampshire rises to aver-

age. In Massachusetts, on the contrary, the leading complaint is of drought. Rhode Island and Connecticut are above average. All the Middle and Southern Atlantic States are below average, except North Carolina and Georgia. In Delaware and Maryland potatoes suffered from severe drought, reducing this crop in the former 27 per cent., and in the latter 35 per cent., below average. Of the Gulf States, Florida is 6 per cent. and Texas 22 per cent. above average; all the rest are below. Arkansas is full average; Tennessee and Kentucky 6 per cent. above; West Virginia 10 per cent. below. North of the Ohio, Indiana and Illinois are full average or above; the others below; Wisconsin being deficient 20 per cent. West of the Mississippi, all the States are above average, except Nebraska, which is 2 per cent. below. California is 7 per cent. below, and Oregon 6 per cent. above.

Sweet potatoes.—With the exception of North Carolina, which is about average, the Middle, Southern, and Southwestern States report deficiencies ranging from 1 to 32 per cent. North of Ohio, Indiana is the only State that rises to average. Missouri and Kansas are full average or above, while all the other Western and the Pacific States are below.

FRUITS.

Apples.—The apple-crop of New England ranges from average to 33 per cent. above. In every one of these States the September returns show an improvement over those of August, except in Rhode Island, where the crop about held its own. Our correspondent in Newport, Rhode Island, says that the apple-crop of that region has grown very precarious of late years; crops of ten years together do not now equal what was considered a good crop thirty or forty years ago. In Norfolk County, Massachusetts, cider-apples are so abundant as to sell at 10 and 15 cents per bushel. In Windham County, Connecticut, the canker-worm (*Anysopteryx vernata*) was troublesome in a few orchards.

In New York the apple-crop rose, during August, from 2 per cent. below average to 6 per cent. above. Complaints of falling from the trees were mentioned in the August returns, in several counties. In New Jersey the crop slightly improved during August, reaching 22 per cent. above average. In Gloucester and Morris Counties the fruit is reported as especially fine. In Pennsylvania the crop, during August, rose from 15 per cent. to 24 per cent. above average. In Berks County the market was overstocked, and thousands of bushels left to rot upon the trees. Several counties report crops exceeding any former ones. In Delaware the crop was not only excellent, but it appears to have improved during August. The August returns represented it 50 per cent., and the September returns as 75 per cent., above average.

In Maryland the crop is reported at 19 per cent. above average, with a considerable improvement during the previous month. This abundance appears to be general throughout the State. In Virginia it rose nearly to a general average, though shortened by drought in some localities. In North Carolina it was abundant and generally good. In one or two counties late frosts were quite destructive. In South Carolina it was not over two-thirds of an average in quality, and generally inferior. Georgia reports an inferior crop, declining during August, though in some localities the fruit was unusually fine and well flavored. In Florida it was comparatively a failure, and in Alabama and Mississippi considerably below average. The rot was quite severe in many places. In Louisiana and Texas the general yield was satisfactory, though in some places the fruit was imperfectly developed and fell prematurely from the

trees. In Bexar County, Texas, it was remarked that young apple-trees yielded astonishingly.

The crop ranged from 4 per cent to 15 per cent. above average in Arkansas, Tennessee, West Virginia, and Kentucky. In some places the fruit rotted considerably and fell from the trees, but in other localities the crops exceeded those of any former year.

The yield was about average in Ohio, Indiana, and Illinois. In some counties the trees were loaded with fine fruit, especially in orchards that failed of a crop last year. In Bureau County, Illinois, the fruit sold at $1 per barrel, and in Warren County, Ohio, as low as 40 cents per barrel. The crop of Michigan was reduced by drought 5 per cent. below average, and in some localities the keeping qualities of the fruit considerably depreciated. In Wisconsin the yield is reported 23 per per cent. below average. West of the Mississippi the crop amounted to about an average, Nebraska declining from 15 per cent. to 3 per cent. above during the month of August. In these States apple-culture is in a comparatively infantile condition, but gives promise of great results hereafter. On the Pacific coast the yield is quite inferior, having been cut short by spring frosts.

Peaches.—Peach-culture is not of sufficient importance in Northern New England to attract much notice from our correspondents, yet in New Hampshire the crop is 15 per cent. above average, with a decided improvement during August. In Rhode Island it is noticed that peaches, like apples, are becoming quite precarious. In Connecticut the crop is below average, having declined during August. In Massachusetts the few peach-trees that escaped the severe freezing of last winter were loaded with fruit.

In New York the crop rose during August to 9 per cent., and in New Jersey to 10 per cent., above average. In Morris County, New Jersey, Hale's Early ripened early, but was inclined to rot. Pennsylvania was about average. The crop of Delaware was reduced, in July, one-half, and in August two-thirds, by the extreme drought. In all the South Atlantic and Gulf coast States the crop was quite inferior, except in North Carolina, where it was 5 per cent. above average, and in Texas, where it was about average. Several counties, however, presented marked exceptions, the fruit being unusually fine and abundant. In some counties of Louisiana the ravages of insects are noted. Arkansas and Kentucky are considerably below average, while West Virginia reports but little over a half crop. Tennessee is about average in spite of injuries to early fruit by excessive rains in some counties.

Ohio and Michigan report less than a half crop, complaints of winter-killing being numerous, while Indiana is 5 per cent. and Illinois 15 per cent. above average. In Saint Clair County, Illinois, the crop was so abundant as to lose almost all marketable value. In Wisconsin and Minnesota peach-culture is not sufficiently important to attract attention. In the other States west of the Mississippi River the reports are highly satisfactory, showing a condition of the crop ranging from 6 per cent. to 33 per cent. above average. In California and Oregon there will be less than three-quarters of a crop. The crop of the Pacific coast, however, will, in coming years, be greatly increased by the yield of large numbers of young trees lately planted.

Grapes.—The grape crop of the New England and Middle States is below average, except in Rhode Island, where it is 5 per cent. above, and in Delaware, where it is a full average. In most of these States the reports show a decline during August. The South Atlantic and Gulf States are full average or above, the Scuppernong enjoying its usual

prominence. In a few localities excessive rains have developed a tendency to rot and mildew, but the general condition of the crop appears to be quite satisfactory. In Louisiana insects were troublesome in some cases. Arkansas is considerably below average. In Bradley County the Iona and Delaware rotted badly, but the Concord, Allen, and Rogers hybrids did well. The Scuppernong never fails in that region. Tennessee and Kentucky are above average, but West Virginia falls 3 per cent. below. In Randolph County Concords were excellent, but Isabellas rotted badly. In Ohio and Michigan the crop is deficient, but in the other States north of the Ohio River it is considerably better than usual. In Knox County, Illinois, Concords, Clintons, and Delawares fruited well; Rogers hybrids were largely winter-killed. West of the Mississippi the crop was above average, except in Minnesota, 3 per cent. below. In Muscatine County, Iowa, it is reported as enormous. In New Mexico complaints are received of injuries to the crop by hail and flies. In California the crop was reduced 13 per cent. below average. Sun-scald, mildew, drought, and foggy weather are mentioned among the causes of the decline. In El Dorado County foreign grap
full average, being somewhat better than native varieties. Oregon reports full crops.

Miscellaneous.—Pears were remarkably fine in Middlesex County, Connecticut, and King George County, Virginia. In Lee County, Mississippi, Duchesse pears rotted considerably. In Jefferson County, Kentucky, pears were much injured by insects. Pear culture has been commenced in Washington County, Nebraska, with very good prospects. Strawberry culture was remarkably successful in Somerset County, Maine, Hillsborough County, New Hampshire, Steuben County, New York, and Santa Fé County, New Mexico. In Manatee County, Florida, guavas were reported as plentiful, and ripening fast. Oranges were expected to be fit for shipment by the middle of September. Bananas were better than for three years. Encouraging reports of the orange crop also come from one or two counties in Louisiana.

Table showing the condition of the crops, &c., on the 1st day of September, 1872.

STATES.	Corn. Average condition Sept. 1.	Wheat. Average condition when harvested.	Rye. Average condition when harvest'd.	Oats. Average condition when harvested.	Barley. Average condition when harvested.	Buckwheat. Average condition September 1.	Potatoes, (Solanum tuberosum.) Average condition September 1.	Potatoes, (Batatus edulis, sweet.) Average condition September 1.	Tobacco. Average condition Sept. 1.	Cotton. Average condition Sept. 1.	HAY. Product of timothy compared with last year.	HAY. Average condition of timothy when harvest'd.	HAY. Product of hay of all kinds compared with last year.	Beans. Average condition Sept. 1.	Sorghum. Average condition Sept. 1.	Sugar-cane, (not sorghum.) Average condition Sept. 1.	HOPS. Acreage compared with last year.	HOPS. Average condition Sept. 1.	STOCK HOGS. Number for fattening compared with last year.	STOCK HOGS. Average condition as to weight and size.	Wool. Weight of fleece compared with an average clip.	Apples. Average condition Sept. 1.	Peaches. Products compared with an average.	Grapes. Average condition Sept. 1.
Maine	107	109	104	108	97	102	88	.....	....	....	143	110	152	101	....	.....	88	110	97	101	97	108	.....	89
N. Hampshire	106	95	99	95	95	95	100	.....	....	....	119	105	125	102	....	.....	100	93	95	103	101	132	115	90
Vermont	102	91	99	96	94	100	92	.....	....	....	118	93	128	89	....	.....	91	106	95	102	101	100	.....	93
Massachusetts	105	97	97	96	95	97	99	.....	99	....	98	105	102	97	....	.....	.....	....	100	102	93	133	77	94
Rhode Island	105	.....	100	95	95	.....	102	.....	....	....	100	100	100	95	....	.....	.....	....	100	100	105	100	100	105
Connecticut	107	98	99	105	102	102	102	.....	108	....	104	96	104	100	....	.....	.....	....	95	99	101	131	96	78
New York	110	85	95	99	95	97	98	.....	106	....	98	95	103	98	....	.....	95	99	96	100	101	106	107	88
New Jersey	110	89	93	86	.....	101	85	90	....	....	96	90	90	96	....	.....	100	100	98	102	100	122	110	84
Pennsylvania	109	76	91	92	92	105	96	96	102	....	102	95	101	98	92	.....	98	103	98	101	100	124	99	91
Delaware	57	92	....	86	.....	90	73	68	....	....	57	50	55	75	62	.....	.....	....	100	100	100	175	30	100
Maryland	86	74	82	69	73	86	65	81	....	....	60	84	62	99	83	.....	.....	....	101	103	102	119	92	118
Virginia	95	99	95	75	.....	95	85	89	91	97	67	78	69	88	93	.....	.....	....	100	98	99	98	89	107
North Carolina	112	109	104	107	100	96	103	101	105	101	103	101	109	103	93	.....	.....	....	100	103	100	109	105	105
South Carolina	106	102	94	76	100	.....	89	93	....	95	.....	.....	111	101	107	100	.....	....	97	97	100	95	97	104
Georgia	108	104	96	87	99	100	100	98	103	96	90	85	106	106	101	91	.....	....	99	100	97	91	89	99
Florida	92	.....	82	98	.....	.....	106	99	....	92	.....	.....	100	....	....	104	.....	....	105	96	98	....	83	100
Alabama	107	105	92	93	100	.....	91	96	101	88	83	88	98	88	99	100	.....	....	109	105	100	92	87	100
Mississippi	113	102	100	88	.....	.....	95	97	100	90	.....	.....	96	98	98	99	.....	....	101	101	100	84	73	100
Louisiana	120	112	....	97	.....	.....	96	95	100	86	.....	.....	114	120	....	104	.....	....	92	100	103	82	83	100
Texas	115	120	111	111	106	.....	122	86	100	94	110	110	104	105	102	98	.....	....	96	100	105	99	100	109
Arkansas	100	106	....	105	.....	.....	101	94	105	78	101	103	111	87	97	.....	.....	....	107	96	97	96	84	86
Tennessee	105	116	105	106	102	108	106	98	91	92	90	99	97	102	99	.....	.....	....	97	100	99	104	101	112
West Virginia	100	96	94	97	88	97	90	94	100	....	87	91	87	97	95	.....	97	95	104	99	100	100	57	97
Kentucky	115	110	105	105	105	94	106	99	100	....	100	96	101	103	101	.....	.....	....	104	103	101	115	87	105
Ohio	108	84	94	91	90	93	91	92	92	....	82	90	82	99	98	.....	100	99	101	102	100	101	47	89
Michigan	99	95	99	92	96	99	81	88	....	....	98	99	97	99	92	.....	103	101	101	101	101	95	49	87
Indiana	105	97	99	99	93	94	100	101	98	....	99	97	100	97	97	.....	90	102	103	103	101	102	105	107
Illinois	107	95	99	100	95	96	105	99	101	....	105	98	103	97	98	.....	.....	....	100	101	102	99	115	104
Wisconsin	98	98	101	92	99	92	80	.....	85	....	102	102	107	91	105	.....	102	111	103	101	102	77	.....	100
Minnesota	98	104	103	104	103	104	113	.....	....	....	107	105	105	99	96	.....	96	101	96	101	102	100	.....	97
Iowa	104	100	99	98	99	99	103	96	96	....	98	97	104	102	99	.....	93	94	102	102	106	98	106	102
Missouri	110	70	85	108	90	103	105	100	103	105	112	101	114	95	97	.....	.....	....	104	103	100	93	110	101
Kansas	112	85	101	111	100	102	101	101	96	....	112	96	102	99	98	.....	.....	....	121	108	102	102	133	107
Nebraska	111	109	108	114	108	110	98	107	107	....	110	107	111	115	105	.....	.....	....	120	108	95	103	128	112
California	103	.....	106	99	97	98	93	92	....	....	96	105	104	101	....	.....	147	112	101	100	100	82	73	87
Oregon	101	96	100	96	100	.....	106	.....	....	....	98	99	103	105	....	.....	.....	....	90	95	103	95	69	100

Table showing the condition of the crops, &c., on the 1st day of August, 1872.

STATES.	Corn. Average condition August 1.	Spring-wheat. Average condition August 1.	Spring-rye. Average condition August 1.	Oats. Average condition August 1.	Barley. Average condition August 1.	BUCKWHEAT.		Potatoes, (Solanum tuberosum.) Average condition August 1.	Potatoes, (Batatus edulus, sweet.) Average condition August 1.	Tobacco. Average condition August 1.	HAY.			Pasture. Average condition August 1.	Beans. Average condition August 1.	Cotton. Average condition August 1.	Sorghum. Average condition August 1.	Sugar-cane, (not sorghum.) Average condition August 1.	Apples. Average condition August 1.	Peaches. Average condition August 1.	Grapes. Average condition August 1.
						Acreage compared with last year.	Average condition August 1.				Average condition of timothy Aug. 1.	Product of clover compared with last year.	Average condition of clover when harvested.								
Maine	110	108	105	108	104	104	105	106	.....	.....	101	123	103	115	105	.....	.....	.....	105	.....	100
N. Hampshire	103	102	99	100	100	102	102	100	.....	.....	101	121	105	110	102	.....	.....	.....	107	103	95
Vermont	101	106	104	110	101	97	101	102	.....	.....	111	115	101	111	103	.....	.....	.....	90	.....	85
Massachusetts	104	98	98	100	100	98	100	105	.....	83	93	87	91	105	100	.....	.....	.....	110	86	83
Rhode Island	100	.....	100	102	98	.....	.....	101	.....	.....	96	100	101	96	102	.....	.....	.....	101	96	103
Connecticut	110	.....	.....	100	105	96	97	101	.....	91	96	108	97	109	101	.....	.....	.....	115	103	88
New York	107	101	102	106	105	100	102	105	.....	102	97	96	97	105	102	.....	.....	.....	99	98	89
New Jersey	103	.....	.....	82	.....	97	100	90	88	.....	80	82	99	89	98	.....	.....	.....	120	102	99
Pennsylvania	104	97	92	98	95	107	103	101	99	98	88	92	90	98	100	.....	.....	.....	115	101	96
Delaware	96	.....	.....	85	.....	102	100	72	70	.....	46	46	46	50	67	.....	57	.....	150	51	110
Maryland	84	.....	.....	64	75	104	85	85	87	86	56	60	79	54	75	.....	80	.....	108	77	104
Virginia	92	.....	.....	73	.....	93	99	87	87	88	67	72	83	79	89	101	90	.....	93	82	107
North Carolina	106	.....	.....	103	.....	86	98	102	102	100	105	104	98	102	102	99	96	.....	105	97	102
South Carolina	98	.....	.....	70	.....	.....	.....	88	86	.....	.....	111	103	98	90	98	100	.....	88	87	111
Georgia	105	.....	.....	90	102	101	97	95	97	96	95	105	98	101	101	104	101	99	94	90	100
Florida	84	.....	.....	82	.....	.....	.....	82	95	92	.....	.....	.....	100	77	96	.....	99	65	70	103
Alabama	108	.....	.....	95	100	.....	.....	93	101	98	93	98	97	108	100	107	98	101	92	91	99
Mississippi	116	.....	.....	86	.....	.....	.....	100	101	104	98	105	102	109	100	112	105	100	93	79	106
Louisiana	118	.....	.....	101	.....	.....	.....	96	110	100	.....	.....	.....	130	77	101	.....	94	105	81	96
Texas	112	.....	.....	112	116	.....	.....	112	98	101	106	.....	.....	100	93	103	105	100	104	98	101
Arkansas	103	.....	.....	112	.....	.....	.....	117	107	109	101	106	106	111	105	96	101	.....	118	102	94
Tennessee	108	.....	.....	102	94	113	102	109	103	103	97	99	99	106	101	104	104	.....	108	102	107
West Virginia	104	.....	.....	99	95	100	100	101	97	98	86	87	94	97	99	.....	95	.....	102	62	97
Kentucky	114	.....	.....	100	101	104	107	111	100	101	95	101	99	110	104	.....	100	.....	111	98	102
Ohio	101	89	98	91	90	103	98	99	96	90	80	86	93	95	98	.....	97	.....	97	30	84
Michigan	96	96	97	93	98	96	93	92	.....	.....	.....	94	102	85	99	.....	100	.....	92	70	91
Indiana	103	91	100	103	90	98	101	111	99	99	91	97	98	102	101	.....	98	.....	97	95	103
Illinois	106	99	97	98	96	97	97	107	104	101	96	98	100	104	100	.....	98	.....	97	112	100
Wisconsin	94	95	101	97	95	94	94	90	.....	96	105	117	104	94	103	.....	.....	.....	70	.....	104
Minnesota	94	109	102	111	106	99	101	111	.....	.....	105	95	95	110	103	.....	94	.....	99	.....	92
Iowa	100	100	105	105	100	102	101	104	97	97	93	97	100	102	100	.....	96	.....	99	100	105
Missouri	110	85	.....	108	90	113	105	110	105	99	102	101	102	113	101	102	99	.....	98	120	106
Kansas	114	96	91	105	97	120	100	109	102	92	97	108	97	103	100	.....	99	.....	99	111	107
Nebraska	116	112	.....	113	110	99	101	98	95	.....	95	109	.....	111	111	.....	104	.....	115	120	122
California	106	95	113	95	92	140	90	98	94	.....	92	105	106	98	108	.....	.....	.....	88	79	94
Oregon	99	92	88	94	92	100	96	91	.....	.....	90	89	96	93	102	.....	.....	.....	74	80	93

EXTRACTS FROM CASUAL CORRESPONDENTS.

STOCK-BREEDING.

Shenandoah, Virginia.—I have now been in the business of breeding and raising pure Short Horn cattle for twenty-five years, and am firm in the belief that they are, as a breed, far superior to, and much more profitable to handle than our common stock. To demonstrate this, I give a statement of the sales of 26 head of cattle, raised before the war, when beef commanded ordinary prices. The calves were fed on bran and hay the first winter, on hay, fodder, and straw the second and third, and grazed well during the summers. They were fattened on twenty-two bushels of corn each, weighing, at an average age of three years eleven months and a half, from 1,500 to 1,985 pounds; nine of them bringing $91.11, fifteen, $100, and two, $106, per head, or an average of $97.38 each. From my observation I think these prices are at least 30 per cent. better than could have been obtained for any common stock ever raised or fattened in this section of the country.

STOCK-RAISING.

Granger, Texas.—We are now undergoing quite a revolution in the way of stock-raising. Heretofore the ease and cheapness with which cattle have been raised, roaming at large upon our vast prairies, have prevented our people from any extra labor or outlay that might be necessary to improve their stocks of cattle. But within the past two years the grass upon the prairies, from over-stocking, has deteriorated so much in quality and quantity that our nomadic system must give way to a more profitable mode of stock-raising. Still, such is the expense of importing stock, owing to our interior situation, and the risk attending the same from casualties on the route and acclimation after arrival, that importations on an extensive scale cannot be expected for some time. However, a few enterprising citizens are giving the subject especial attention, and we hope in a few years to have native-born breeders from imported stock, to which time we anxiously look as the dawning of a new era in the history of our country.

Experience teaches me that, with proper attention, no country is better adapted to sheep-raising than this, though our people have been greatly discouraged, from the fact that whole flocks sometimes die out in a few weeks, but the cause is emaciation, superinduced by the disease known as the scab, and the practice of indefinitely increasing the size of flocks, and not providing for them in winter.

We have lately received most valuable acquisitions to our hog-stock by the introduction of thorough-bred Chester White, Berkshire, Poland, China, Neapolitan, and Essex. Much attention is now being paid to this stock.

Our county boasts some dozen or more thorough-bred stallions, besides numbers of brood-mares. Altogether, I think our prospects for rapid improvement in stock-raising are quite flattering.

Edgefield, South Carolina.—My land is adapted to the culture of cotton, and only about half enough corn is produced for home consumption, all long forage being carefully husbanded for work-stock. Cattle are not fed through winter at all, and I could have a marketable beef at any time from my small herd without making much choice.

After the cattle pick over our corn-fields in the fall they are turned into the cotton-fields, (the crop having been gathered,) the tender limbs and immature bolls affording excellent winter pasturage for awhile; after which the small winter undergrowth among the broom-grass in the old fields keeps them in fair condition until the spring pasturage is ready. It is my experience that cattle, if not fed regularly, do better not fed at all through the winter. On my farm, of about 600 acres, half of it turned out and spontaneously set with a species of wild clover and broom-grass, I could winter 40 head of cattle.

Nemaha, Nebraska.—The amount of stock of all kinds is rapidly increasing, owing mainly to the passage of a herd-law.

CATTLE-DISEASE.

East Baton Rouge, Louisiana.—Some few cattle have died during the past summer; supposed to have been poisoned in browsing, or drinking stagnant and impure water. Nothing is known positively as to the real cause, nature, or treatment of said disease. I examined two cases that resulted fatally some five or six days after the attack. The symptoms were general lassitude, a drawn up or contracted body, loss of appetite, and obstinate constipation. The only lesions discoverable after death were softening and an easy separature of the mucous lining of the stomach proper. Long-digested and half-digested food were impacted and pressed in between the folds, rather dry; and the mucous coat separated and peeled off upon the slightest effort. No ulceration anywhere discoverable. The feces in the bowels natural and rather dry.

DISEASE AMONG HORSES.

Lee, Iowa.—There is a fearful disease here among horses. Veterinarians say it is congestion of the small blood-vessels. It sometimes commences in the limbs and sometimes in the head. It is something like erysipelas. If not attended to when the horse is first taken it will soon terminate fatally. We had a very fine horse die with it. It commenced in her limbs, which began to swell, and appeared stiff; it extended to her head, throat, and lungs. The throat swelled dreadfully. We poulticed with may-weed until the swelling went down, but it broke inside.

COTTON IN CALIFORNIA.

Sonoma, July 20, 1872.—The cultivation of cotton, which has already proved a success in Merced and other central counties in this State, is attracting the attention of the more progressive of our own farmers. Accordingly, this year, the experiment of raising it here has been undertaken by Messrs. Miller & Nealy in Dry Creek Valley. The plants at this time look thrifty, being full three feet high, with promises of an abundant crop. Other parties have also engaged in its cultivation. Should the soil and climate of this county be found favorable to its production, there is no doubt that it will, ere long, be very extensively cultivated. Successive cultivation of wheat for years has very much impoverished the soil. Our farmers must seek some other crops, or ruin their lands. Cotton may fill this want; and, if so, Sonoma County, with its genial climate, and rich, productive soil, may soon help to restore king cotton to his throne.

CONDITION OF COTTON IN SOUTHERN MISSISSIPPI.

Brookville, Noxubee County, Mississippi, August 29, 1872.—The cotton crop I regard as a failure, resulting from various causes. One-third of the crop of this county was planted very late, and, owing to the long dry spell, did not come up in time to make a good yield. This late planting is now being discovered by that pest the army-worm. This young cotton, which, a few days ago, promised a large yield, say from 800 to 1,000 pounds per acre, will not make on the average 200 pounds seed-cotton. I do not regard a single bloom that has appeared within the last fifteen days, or that shall hereafter appear, as of any account. Nearly all the young bolls have dropped, or are now being destroyed by the worm stripping the young bolls of the cup surrounding them, and thus stopping their growth. The rust has taken possession of all the poor upland cotton, being now dry as stubble. Last week, in visiting Columbus, I saw considerable sandy land, and did not see an acre that would produce 300 pounds; many acres will not yield 200 pounds. This same land last year made from 800 to 1,000 pounds seed-cotton. I am safe in saying that the crop, not only of this, but also of Lowndes County, and Pickens County, Alabama, has fallen off at least 50 per cent. within the last twenty days. To make a large yield, we should have bloom until September 10, but this year very little bloom after August 10 will make cotton. The three counties, Noxubee, Lowndes, and Pickens, Alabama, will not make as much as they did last year. If the general crop is no better than in these three counties, it cannot reach 3,000,000 bales. Our labor is doing finely—gathering the crop rapidly. Nearly the entire crop will be open in a few weeks, as the sun can directly reach the bolls, since in a few days more all the leaves will be destroyed by the worms.

POISONOUS PASTURAGE.

Columbia, Florida.—There is a belt of land, some two or three miles wide by ten or twelve long, upon which no cattle can be raised, an occasional case excepted. They are attacked with *flux* or *scours*, which reduces them very fast, and soon causes their death. It is called by the old herdsmen here, "pond disease," but the few cypress ponds are hardly sufficient to account for it, since we find similar ponds where the cattle are quite healthy. Some residents of the section have not raised more than a cow or two in ten years, but have lost a great many bought and taken there. Cattle grazing upon it for a week or two are rendered almost incurable. Frequent salting and bleeding by cutting ears and tail, are the principal remedies resorted to, and in bad cases they avail very little. Some think it is caused by eating certain vegetables; others by the dews; while others assert that cattle may feed on the affected belt through the day and remain healthy if driven off at night. There has been some fever among our cattle, doubtless originating from grazing on overflowed lands, which has been done in many localities since the excessive rains of August and September last. It was confined mostly to young cattle, about 10 per cent. of which died.

CALIFORNIA CLOVER.

Victoria, Texas.—The California clover is doing finely. It is at present about 16 inches high. The burs or seed-pods are produced at every joint, the joints being about 1½ inches apart. At each of these there springs up a flower-stalk half an inch in length, terminating in a cluster of small yellow flowers, from four to six in number, from which the burs are formed. These runners or stems grow to three or four feet in length, putting out laterals, jointed like the main stock, and filled with seed-pods which cover the surface of the ground from one to three inches deep, and of which both fowls and animals are exceedingly fond.

JAPAN CLOVER.

Elmore, Alabama.—Thousands of acres have remained unfenced here since the war, and many farms have been abandoned. The lands have grown up in pine, and most of them are now covered with wild clover, (*Lespedesa striata,*) on which cattle and sheep browse daily, and get seal fat; even our horses and mules fatten quickly on it. I know some regard it as worthless, but this is a mistake; it is far superior to our native grass. The red and white clover are both doing well here on small patches.

FARMING IN KANSAS.

Atchison County.—I have traveled through fourteen States and Territories west of Pennsylvania, and this is the best "lazy man's country" I have found. Our pastures are the unbroken prairie, upon which stock runs at large seven or eight months in the year, and from which their supply of winter food can be drawn by simply cutting and stacking the native grass. Corn grows with but little work, one hand attending from 40 to 60 acres with a sulky-plow, on land only half broken up in the spring, and planted with a horse-planter. Some land which has been planted in corn for the last sixteen years still averages from 30 to 70 bushels of shelled corn per acre.

ALKALI SOIL FOR CORN.

Los Angelos, California.—We think here that it is owing to the presence of this alkali, (which abounds here,) more than to any other reason, that corn produces from 50 to 140 bushels of shelled corn to the acre, with almost no cultivation after planting. Would this alkali added to other soils make them produce greater crops of corn?

A FRUITFUL PROSPECT.

Lee, Mississippi.—The declaration of all men is that they never saw, at this season of the year, so good a prospect for fine crops in this county, and the cultivation has been better than ever before. The freedmen are working better than formerly.

BENEFIT OF MUCK AND LIME ON SANDY SOIL.

Ocean, New Jersey.—There is nothing like muck for our sandy lands, a liberal use of which, having previously prepared with lime, will produce most satisfactory results. It holds the moisture when nothing else will. Our poorest land can be made to bloom like a garden.

A FRUITFUL COUNTRY.

Stanislaus, California.—The wheat and barley, the staples of our county, have been harvested, and thrashing is going on rapidly. I have counted thirteen thrashers and separators in operation all in sight. I have visited forty-seven, and find the yield to be over 14 bushels to the acre on the average. From my own observation, and that of my assistants, I place the product of this county at 2,500,000 bushels of wheat, and 800,000 of barley. Our thrasher and separator has been at work twenty-four days with 18 horses and 13 men; has thrashed 24,800 bushels of grain, mostly wheat.

INFLUENCE OF DROUGHT ON THE SOIL.

Hawkins, Tennessee.—Our wheat crop is the best we have had for fifteen years, both white and red. The dry weather of last summer, that ruined our corn crop, seemed to put the land in good condition, so that the best crops were made where corn had been grown the year before.

HOPS.

De Kalb, Illinois.—Hop-yards are becoming quite numerous; the cultivation of the hop is engaging the attention of many. It is found that it is quite at home on the prairie soil; indeed, it grows spontaneously in all the river and creek bottoms, maturing well each year, with few or no parasites.

BROOM-CORN.

Douglas, Illinois.—Broom-corn is quite a product in this county; will produce a full average crop.

ECCENTRIC SEASON.

San Pete, Utah.—The season has changed this year from what it has been since this county was settled. We have had thunder-storms every few days, and some of them extra storms. On the 4th of June a thunder and hail storm passed over Fayette. Hail-stones as big as marbles cut down the garden-truck, cut the fruit off the trees by the bushel; also cut off the young shoots and the bark, almost to their destruction. Hail-stones formed drifts in some places two or three feet deep. On the 24th of June we had another thunder-storm which brought down the water in a solid sheet; it did not stop to rain, but came at once in rivers and took all before it. On the 30th we had a snow-storm which clothed the mountains with a white mantle, but soon disappeared, followed by a slight frost.

METEOROLOGICAL CHANGES.

King George, Virginia.—The rains of August have fluctuated greatly in the last twenty-odd years. In 1867 they amounted to 10.795 inches; 1866, 1.17 inches; 1869, 0.61 inch; 1870, 0.81 inch. These three are the least in twenty-three years. Those of the late August were 1.805 inches.

Holt, Missouri.—We are having so much rain that I fear fully one-half of our wheat will be destroyed by mold or sprouting. When it is not raining the air is so damp that it does not dry. A salt-cellar filled with salt, in twenty-four hours becomes nearly all water, and this dampness has continued for a month. I cannot but believe that the cultivation of the soil and growing of trees north, west, and south of us, where millions of acres have lately been broken up, have affected our climate. Until five years ago it was remarkable for its aridity; since then the moisture has regularly increased, till this year it has become ruinous. Up to the 10th of last April eleven millions of trees had been planted in Nebraska, and millions had been planted in the years before this. We are at the very point to be influenced by this, if any point is; for the clouds formed in Nebraska and Kansas float over us. Certainly our climate is not as it was eighteen years ago.

EUCALYPTUS AND OTHER PLANTS.

Galveston, Texas.—I report progress with seeds of Australian trees received from the Department of Agriculture January 17, 1872, and planted the same date. The eucalyptus or gum-tree has grown in six months, from January 17 to July 17, to the height of 33 inches. Other varieties of the eucalyptus, in the same time, have grown from 12 to 22 inches. The casuarina or beef-wood tree—the native oak of Australia—has grown about 24 inches. I divided the seeds with others, and have received from them reports of success fully equal to mine. The eucalyptus is certainly the most rapid-growing tree I have ever seen.

GRAPES AND WINE.

Lowndes, Georgia.—We have in this county about 32 acres planted with Scuppernong grape, increasing every year, all started since the war. There is a fine opening here for persons wishing to go into wine-making; young vineyards can be bought cheap. Our people are all poor; we want and invite immigrants; land is from $2 to $10 per acre.

Pulaski, Missouri.—There were but few grape-vines in this county before last spring. Then, in this immediate vicinity, some eight or nine acres of vines were planted, and they are growing finely. We have organized a grape and fruit-growers' association.

SUGAR-BEETS IN CALIFORNIA.

Sacramento.—The culture of sugar-beets is attracting much attention in this locality. There are about 1,200 acres now growing, within five miles of Sacramento, along the American River, which promise a heavy yield. The Sacramento Beet-Sugar Company will soon commence working them up.

FULTZ WHEAT.

Buncombe, North Carolina.—The Fultz wheat sent me, put in by different persons and on different kinds of soil, looks very well on strong, deep, stiff, mulatto soil, and, if manured, on gravelly, gray soil. Other varieties of wheat are considerably winter-killed on loose, open, porous soil.

Greenville, South Carolina.—One of the grains of the Fultz wheat, sent me last year by the Department of Agriculture, produced fifty-six stalks, averaging 3 feet high; size of leaf 1 foot long by ⅜ inch wide. Each head contains 30 grains, an increase of 1,680 fold. It has no rust, and is now so far developed that it is independent of any drawbacks from fluctuations of weather. It looks fair and beautiful, a proof that it is in the right belt of earth and climate.

LINCOLN WHEAT.

Jasper, Iowa.—I send you a sample of wheat grown here the last two years, by the name of Lincoln wheat, a bearded variety. It is the hardiest, most productive, and in every respect the best wheat I have ever seen. It should be well distributed through the States that grow spring-wheat. It is neither early nor late in maturing.

ROTATION IN CROPS.

Greenville, South Carolina.—Ninety-nine times in a hundred, wheat planted here by the 10th of October will yield a good crop by the 10th of June. Clover-seed, rolled in at the same time with the wheat, will give a crop of "stubble-hay" after the wheat comes off, better for cattle than corn-fodder. If the land is good, the clover, which stands three years, will yield a larger profit in hay than any other crop. Then clover-sod, plowed in and put to corn, will give 30 bushels to the acre. Then, with six wagon-loads of barn-yard manure to the acre, plowed in, it will yield a wheat crop of from 12 to 15 bushels per acre. Then let the field stand in clover and rest for three years again.

DISASTROUS FLOODS.

Greene, Missouri.—An abundant harvest is generally promised, though in some sections there have been disastrous floods, completely ruining bottom-farms, washing the soil entirely away, and leaving beds of gravel in its place. In some instances the first intimation of danger would be the noise of the flood coming down the valley, which was described as a wall of water, 6 feet high, reaching from bluff to bluff. Eye-witnesses say that two dense clouds came from opposite quarters of the heavens, and that when they met a perfect deluge followed. Several lives were lost.

Ada County, Idaho Territory.—The unusually high waters in the Boise and Payette Rivers, upon which are situated most of the cultivated lands of the county, have seriously damaged the grain crop, though it is hoped that the injury will be found to be less than at present reported—some estimating it at one-fourth of the entire crop. The waters are now subsiding rapidly.

THE MINNESOTA STATE FAIR.

The annual fair of the Minnesota State Agricultural Society was held at St. Paul on the 17th, 18th, 19th, and 20th of September. An address was delivered on the third day of the fair by the Commissioner of Agriculture, the greater part of which is herewith presented:

FARMERS AND CITIZENS OF MINNESOTA: In passing through your most interesting State, viewing your splendidly built cities and towns and lovely farms, it requires a thoughtful imagination to realize the truth that, as a State, you had no existence five and twenty years ago. It seems as if enchantment had lent its powers of creation, or that all these extensive works had been spoken into existence by a miraculous agency. But things around teach us otherwise, and we recur to the prodigious enterprise of the American people; and when we look into the philosophy of that, our amazement is subdued by the vastness of the field in which we live. The minds of men expand or contract with the objects which surround them. But I came not here to philosophize, but to commune with an agricultural people on a subject which peculiarily belongs to them. As the curiosities of literature attract the attention of the philosopher, so do those natural curiosities which grow out of the consideration of the mouths and lungs of the earth, the development and growth of plants, their life and death, their products and their uses, attract the attention of farmers. There is no occupation of life to which the teachings of science are so applicable as that of agriculture, and no teaching so useless and deceptive when unaccompanied by practical experience.

You are an agricultural people; the statistics of your State, so wisely and carefully collected and published, evince the great interest you take in this subject. For more than forty years have I been engaged in conducting the operations of a farm, not so much with the view of pecuniary profit as for the indulgence of an ardent fondness for the study of the mysteries of the art of farming. I will be indulged, therefore, in the discussion of a subject so familiar to you.

The first and great leading idea which presents itself with regard to the management of a farm is rotation of crops. Wheat is the great staple commodity of your State; and while the genial nature of your soil, the delightful character of your summers, and the natural instincts of reason forbid the cultivation of this grain alone, I fear you are prone to forget that there are certain and fixed principles, dictated by natural laws, over which you have no control, which must be observed in the course of farming. It is not worth while to inquire into the mysterious influence which the growth of one plant exerts upon the production of that which succeeds it; it is enough that we do know and to some extent act upon the knowledge that a rotation from one crop to another is essential to the successful growth of any. It is a fact within the knowledge of every observing man that the average product per acre of wheat everywhere throughout the United States has diminished in quantity, and that the grain itself has degenerated in quality. Acquired knowledge of the science of agriculture, improved skill in the use of that knowledge, and greater experience in the application of both—the ingenuity of the mechanic coming to our aid to supply us with such implements as almost supersede the drudgery of labor—notwithstanding all these, wheat, the great leading crop of the country, has fallen off. Why is this, in a period when the same efforts of science and industry in England have increased their crop nearly five bushels to the acre? It is because, while they not only study to know what

crops and what rotation of those crops are best adapted to their soil, they pursue that rotation with a determination of purpose with which no accident or exigency is allowed to interfere. While the growth of the various root crops enters largely into their system of cultivation, it is because experience has taught them that it is an essential item in a proper course of rotation and conduces to the growth of wheat. Now, while the root crop may or may not be congenial to your soil and climate, or may or may not conduce to the maintenance of your wheat crop, it is well that you should learn the lesson of experience. And I here take occasion to suggest that moisture is the prominent characteristic of the climate of England, and that there is no part of the United States so dotted with lakes and traversed by rivers as the State of Minnesota, and, therefore, perhaps, no part of it so well adapted to the growth of wheat.

There is a fitness of things in the rotation of crops which commends it to our judgment. It is adapted to our necessities. We must have bread, because it is the staff of life; we must have meat, because it is essential to the growth and strength of man; we must have the power of animals to do our work; and we must have gardens and fruits to furnish the enjoyments of life and the comforts of health. The wheat crop supplies our bread; corn enables us to make our meat; rye, oats, and grass to feed the animals which supply our labor; and, therefore, it is a part of God's plan of creation that these crops should alternate, and that their successful growth should be dependent upon one another. He is a daring man, and will ultimately be an unsuccessful farmer, who runs counter to this plain dictate of Providence.

Hessian fly, midge, army-worm, and divers and nameless insects depredate upon the wheat crop, and in the Eastern States smut and mildew prevail to a great extent, and we are prone to attribute these to any cause which will relieve ourselves from the imputation of bad farming. Our daily observation is that vermin always attack a poor and diseased animal, and the analogy is perfect with regard to their depredations upon the poor and worn-out earth. Exhaustion is productive of vermin, vermin of disease, disease of death. Again, we are too much in the habit of treating the occupation of the farmer as a die cast upon the board of chance, to be consigned to the exigencies of time and season; when, on the contrary, all our work should be so performed as to anticipate time and season, and provide for their contingencies.

There is one other subject to which I desire to direct your special attention: the selection of seed. There is no more common idea than that seed degenerates from long use. No idea is more erroneous. If the general principle were true that vegetation degenerates by cultivation, the world long since would have come to an end. The opposite conclusion is true, that cultivation is the improvement and life of vegetation, and that, by a selection of the best seeds, the best roots, and the best animals, improvement is always the result. If a farmer wanting fifty bushels of seed-wheat will run a hundred bushels through a winnowing-mill until he reduces them to the quantity required, he will improve his crop from five to twenty per cent. This is not a new idea; it has the authority of ages, for Virgil, in his Æneid, and in his own peculiar language, much more emphatically and beautifully expresses it:

> I have seen the largest seeds, tho' viewed with care,
> Degénerate, unless th' industrious hand
> Did yearly cull the largest.

I have neither time nor opportunity now to discuss the subjects of stock-raising, wool-growing, and cheese and butter making, for all which

your natural facilities are such as are seldom bestowed upon any people, and I am pleased to know that they have already attracted your attention. They are to be reckoned among that diversity of agricultural employment which necessarily leads to a rotation of crops. * * *

To those who have put their hands and hearts to the work of promoting the great interest of agriculture there is a pleasing consolation, and encouragement, too, in the reflection that they are upon the flood-tide of public favor; that those they benefit now look with confidence upon the efforts they make; that, while the fluctuations of business, the casualties of commerce, the interruptions of trade, the disturbances of society itself, are but incidents of the moment, only occurring to be as soon forgotten; that, while amid the other and conflicting elements of busy life, the pleasing anticipations and profitable speculations of one class are the dreaded forebodings and dire calamities of another, all classes unite in the fervent prayer, the kindly sympathy, the liveliest hope that success may crown the effort of the farmer. Do we appreciate this? Do we now feel that our art commands the study of the philosopher, the science of the scholar, the eloquence of the statesman; that the whole world, with a unanimity which no other subject can command, lifts up its sympathizing voice to cry "God speed the plow?"

There is a reason for this, and it is found in the fact that the product of this art contributes more largely than any other to human happiness, and that the art itself is better adapted to human skill. These are important considerations. How shall we promote this great art is a question which addresses itself to all of us with a force which must command our attention.

First, then, study to know the subject which thus excites our common interest. Is it enough to understand that if the earth be stirred and the seeds be sown their product and all else is a natural result of God's providence? Is it enough that we should be told and believe that the plow is the best implement with which to till the earth, and that seed sown by the hand of man is all that is necessary to enable us to drag through the natural period of our existence, thus made toilsome and miserable? Is it enough for ourselves to know that we but live and move and have our being? Is that large portion of mankind which is engaged in that work of the world content thus to grovel and crawl, only occasionally to be startled into an attitude of amazement at the prodigious products of the minds of men around us, and again to relapse into the contemplation of our own inferior condition? We answer emphatically, *No!* With regard to our occupation we should rather look upon this lovely earth of ours as the beautiful landscape of God's creation, imbued with the powers of life, to breathe and feed, yielding its elements and products to the nursing and delicate operations of our hands. While we follow the plow we should *perceive its use;* we should see in it how the polished mind of man has infused *mechanical science* into its structure; we should mark well the work it has to do, and its adaptation to the work; we should *contemplate* those seeds we commit to the earth, and believe it is not the work of *chance* that they grow, and that they, too, are imbued with the germinating powers of life and light, and characterized in their existence by the qualities of good and bad; and we should know that perfect analogy which characterizes life in its conception, growth in its progress, the product of its results, and the final death of all vegetable as well as animal creation. But above all and over all we should contemplate ourselves; that we are a part of the special work of God's hands, placed here and employed to direct and govern all these things. They are no artificial objects, on which we are to ex-

pend our happy thoughts and lives; they are the delightful things of nature on which you operate, and nature co-operates with you in all your labors and sweetens them to your contented spirits. Rest upon this as the grand secret of your constant attachment to agricultural pursuits. You work with nature and only modulate and benefit by her functions, as she takes up and quickens and completes the work of your hands.

There is a moving, living, acting principle in your labors which distinguishes them from other pursuits. The earth yields its strength and increase to the seeds you cast upon it, to the cattle that walk upon it; the winds seem to blow, the rains to fall, and the waters to run for you; the very frosts and snows of winter give salutary checks to the rankness of vegetation, lighten the soil, and destroy what is noxious; and every principle of animal and vegetable organization and existence co-operates to support and enrich you. There is a charm in this which must last while the spirit of man feels and acknowledges the strivings of his own mind and the power of God around him.

We do not *reason* thus, but we *feel* it; and it is this mysterious and acting charm which has infused its sweetness into the hearts of all rural people in all ages of the world.

That you are not as intelligent and well-informed as a parallel grade of society in towns we must allow; that you are as truly aware of and united to support your interests we do not mean to assert. Your scattered and isolated mode of life weighs against you on these points; but that you have more sincere hearts and a sounder morality is as indisputable; you have a pureness of purpose, a simplicity of mind, as well as manners, that are more than equivalent for the polish and conventional customs of society, and with all a cordiality which is only to be found in the good, homely, hearty hospitality of a country house.

I have thus endeavored to make the impression that, while you have much to learn, yours is a happy condition of life, and that your pursuit is so essential, and its improvement so important to yourselves and the world at large, as to claim for it a high place in the estimation of mankind; and it is for you to make that claim, for the world never respects the man who does not respect himself.

We must take our place, then, in that race of honorable competition into which all the trades and occupations of life have entered, and whose goal is the honor and glory of exalting their own profession and adding so much to the sum of human happiness.

Who possess advantages superior to yours? With every quality of soil, and with a climate which breathes into all the essential vegetables the breath of life and into man the atmosphere of health, what do you want but to call into action the native strength of your own minds and the energies of your own hands? But that mind which gives direction to the hands must be a cultivated mind, for we should never cease to remember that intellect is that "talent" which the goodness of God bestowed upon His own image; not that it should be buried in the earth, and restored upon the return of its Lord and Master in its original simplicity, but that it should be cultivated, enlarged, and appropriated to His great design. It is demanded of us that we should put our hand to the noble work of education, and especially that we should direct that education to a course of study which will fit the mind and adapt the energies of the body to that expansive, interesting, and delightful subject in which you are engaged and for which the world has yet done so little. * * *

It is for you, then, at all times and under all circumstances, to

demand that, in the practical workings of society, your interests shall be cared for; that while common schools and literary colleges receive the fostering care and bountiful endowments of the Government, the farmers' school demands the like support.

We would have you, too, constantly to summon yourselves to the bar of your own consciences, to contemplate the duty you owe to your own children, to compare the life of ignorance, as it gropes along in its difficult path, that seems to have no other object than that it may breathe and live and die, with the brightened intellect of the intelligent man, who acts under the influence of thought, who moves in a sphere of usefulness and thrift, and whose steps *mark* the path he treads through life.

To the merchant and mechanic, the active and energetic motive powers of busy life, we address ourselves and ask you to look with favor upon any project which shall have for its object the education of the farmer. The busy marts of men are filled with the products of his labors; his success and his profits contribute largely to the trade and commerce which are the product of your enterprise. While the abundant yield of the husbandman enriches him, the result is favorably felt in every department of the merchant's counting-house and the mechanic's shop. As, then, you move and make your impress upon the minds of men, let your actions be tempered with the idea that all business, whether in the merchant's store, the mechanic's shop, or the mariner's ship upon the ocean, is dependent for its working elements upon the products of the farm.

To the professor and the student, to you who already possess the lights of reason and enjoy the fruits of knowledge, we will not appeal in vain that your influence may be thrown into the scale of agricultural progress; that, while you have in your own hands that helm of power which gives direction to the elements of government, you will always have in mind that to promote the true and efficient principles of political economy, to expand and increase the influence of that virtue whereby alone we may hope to maintain our own free Government and laws, is to educate the farmer.

We ask of the statesman, while he advocates the interests of his constituents at the bar of the Senate; of the lawyer, who advocates the cause of his client at the bar of justice, and of that sacred office which advocates the cause of man at the bar of Heaven, that they may ever remember the magnitude of your temporal as well as eternal welfare.

Let us not forget to exhort her, whose influence is always so strongly marked upon the character of men from their cradle to their grave, to think of these things: the *mother*, whose affections root so deeply in the existence of her child, whose anticipations are so often stimulated to painful anxiety for its welfare, who watches its progress in life with an eye to doubt and danger, whose hopes may be elevated to the Giver of all good, that he has smiled graciously upon the career of her darling child, or whose fearful forebodings may be realized in the spectacle that he is despised by the society of men and frowned upon by the attributes of Heaven.

In conclusion, I have a word to say with regard to these your annually occurring exhibitions. Here all is reality. You meet your friends, who are embarked in the same enterprise of life and whose thoughts and hearts are congenial with your own. You see many of whom you before had but heard; and here, too, you learn to realize the force of numbers, of intelligence, of the strength of which you are composed, and that power which may be wielded by your will. You carry to your homes.

in your mind's eye, the beautiful models of your art, the judgment of their use, the calculation of their value, and you see those marvelous productions of your fruitful soil which serve to expand your own views of the extent of the workings of your own skill. These are the delightful points in your life, to which the memory recurs with pleasure; they are the safety-valves which let off the pent-up monotony of a country life; and, therefore, we would have you to remember that these exhibitions are yours; that, while you are their authors and finishers, no one of you should ever fail to be their friend and patron.

AGRICULTURAL IMPLEMENTS.

By the Commissioner of Agriculture.

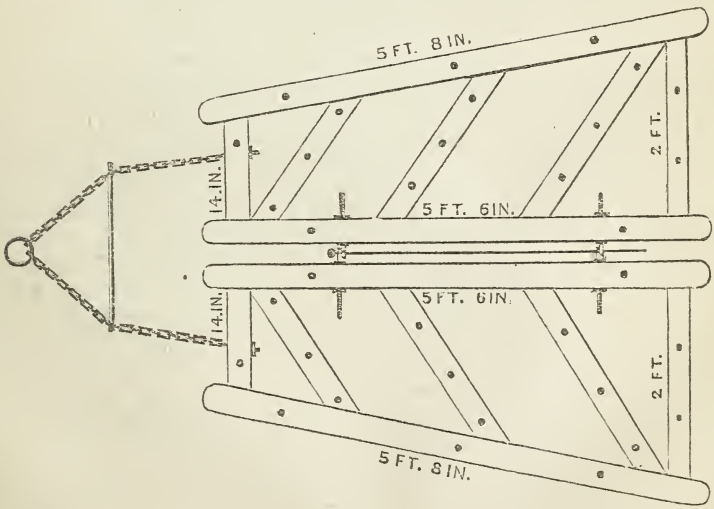
The prejudice once entertained by the mass of agricultural laborers against the use of labor-saving machinery has been entirely dissipated; practical experience having taught that the amount to be done is greatly multiplied by the facility for doing it, and that the demand for laborers continues to increase and wages to be enhanced as the greater amount of labor is accomplished. If two bushels of grain be raised where but one was raised before, the area to be cultivated is greatly increased, and the farmer is better enabled to compensate the laborer, because the aid of his labor has produced a greater amount of profit. These facts, and the inferences fairly deducible therefrom, have led to the abandonment of all opposition to or prejudice against the improved machinery of the farm.

In the midst of the competition which forces upon the market machinery of all kinds, each claiming for itself high qualities and superior capacity, it behooves the purchaser to look well and wisely at the subject, and adopt some general principles which should govern his action in the choice he may make.

To speak of the plow: The same implement will not answer the purpose in all kinds of soil; hence, in making choice of one, the farmer should study the character of his soil and the topography of his farm, for the difference in the mechanical structure of plows is essential. While one is short, abrupt and wide in its working parts, and having no tendency to easy, direct action, another is long, of gradual slope in its mold-board, and its action direct and center-draught. The fitness of each of these must be measured by the character of the work to be accomplished. The object of plowing being to break up and disintegrate the soil, making it pervious to light, heat, and atmospheric food, it seems to follow that the plow that will best accomplish this object is the one which should be chosen; provided, however, that in its use it does not require too much power. In any good plow the principle of direct action, or what is generally termed center-draught, should be found. It consists of such a combination of all the parts, to-wit, mold-board, beam, land-side, bar, and point, that one shall not counteract the operation of the other more than the necessity of the case requires. A competent observer, standing in front of a well-constructed plow, will find its beam, mold-board, bar, and land-side, all in mechanical keeping with each other, not tending in different directions, requiring great power to overcome leverage without accomplishing any useful consequence. The clevis, to which the power is attached, should be back at

the sheath immediately above the mold-board, and connected only at the point of the beam by a rod moving in a rabbet. This arrangement, while it places the point of draught immediately at the work, relieves the beam from the danger of strain and consequent displacement, so destructive of the whole implement. Plows are distinguished by being either right or left handed; that is, throwing the furrow to the right or left side. The use of either is common to particular localities; in some, such a thing as a right-hand plow is not to be found, while in others a left-hand plow is scarcely known. But it may be remarked that where the left-hand plow is used the team is almost invariably driven with a single line, and that of a right-hand plow with a double line; and for the reason—and it is one of the advantages claimed for the left-hand plow—that the lead-horse walks in the furrow, and consequently requires less guiding and less skill in the plowman. There is, perhaps, no implement of husbandry which has undergone so many changes and so many improvements as the plow; and now every part of it is calculated with a mechanical nicety, that it may be the better adapted to the work which it has to perform.

The harrow is an implement of no less importance than the plow, and has, perhaps, undergone as many changes. The rotary, the square, the conical, the single, and the double harrows have all, in their turn, claimed precedence of each other. The position of the teeth, whether they shall incline backward, forward, or laterally, are all mooted points which elicit the inquiry of the farmer. To attain the great object of pulverizing the soil, the rotary harrow has in it a plausibility which demands attention, and if the ground to be harrowed were always free from stubble and weeds it would act well its part; but for practical every-day work, upon all qualities of soil, it is not to be relied upon. Its machinery is too complicated, and it may very well be doubted whether any implement having spindles and journals which come in contact with plowed ground, will answer the purpose intended. But there are certain



principles connected with the construction and use of the harrow which should always be kept steadily in view. The teeth should have such a relative position that they should not follow each other in the same

track; and, further to insure this, the harrow should be so constructed that its motion forward should be steady, swayed neither to the one side nor to the other, either by impediments in the way or inequalities in the surface. It should pursue its course as steadily as the plow itself, for if the teeth are so placed in the harrow that by a straight forward movement they will not follow each other, when the motion is irregular they will follow each other. This is to be prevented only in the structure of the implement and the adaptation of the power so that the draught shall be from two points instead of one. This idea cannot be so well illustrated as by a drawing.

The material of this harrow should be of white-oak or other hard wood, in size 4 by 4 inches, and the teeth of steel three-fourths of an inch square and set straight in the wood. It will be perceived that the main beams may be separated by means of the screws and nuts which connect the parts, thus, so to separate them, as to make it useful to harrow corn at its first stage of cultivation.

The reaper and mower, or the two combined, have become indispensable implements upon the farm, because they greatly cheapen the expense of the harvest, as may be shown by a plain calculation: A machine and pair of horses will easily cut ten acres of wheat in a day, and this requires a driver and six hands to rake and bind.

Allowing cost of team, at	$2 00
Seven men, at $1.50 per day each	10 50
Making the cost of putting up ten acres	12 50

Using the cradle, which is the next cheapest mode of cutting grain, the same number of acres would require—

Five cradlers, at $2 per day	$10 00
Ten rakers and binders, (called followers,) at $1.50 each	15 00
Making the same amount of work cost	25 00

These estimates of cost are based upon prices actually paid in the interior of Pennsylvania during the past summer, so that it is made manifest that the machine is indispensable.

There is no implement by which the farmer is so likely to be deceived as this one. The variety is endless, and each has the sanction of a Government patent for some feature of its structure, to add plausibility to its value. It may truly be said of all these that when new, well put up, oiled, with a good team in the hands of an expert, and smooth ground, they will do excellent work; but on the farm these conditions are not always present, and the implement, which is an expensive one, is found to be wholly inefficient by reason of a radical defect in the mechanical principles of its construction.

The work to be done by a reaper and that by a mower differ in important particulars. One will not do the work of both for the reason that the latter requires a higher degree of speed. Grass stands thicker than grain; the machine cuts closer to the earth and consequently meets with more entangling impediments, and to overcome these there is required a higher degree of speed. By a late invention this is sought to be accomplished by a substitution in the reaper of a spur-wheel of less diameter to work upon the master-wheel, thus producing a higher speed. How far other parts of the gearing may be calculated to endure this

greater strain time and experience will demonstrate. Apart from the consideration of the mechanical construction of the power by which action is given to the knife and reel, there is less difference in the principle of cutting grain than might be imagined; all cut with a knife against a steel, the two forming, as it were, the blades of shears, the former gathering the grain and forcing it against the latter to be cut off. The McCormick machine is, perhaps, the only one which is an exception, for it does not profess to cut upon the principle of shears, the blades of the knife being oval instead of pointed, and therefore incapable of gathering to any material extent; their edges serrated instead of smooth, so that when the standing grain is touched by the knife it is cut. The blades of many other machines have serrated edges, but none of them cut upon the same principle. McCormick of Virginia, and Hussey of Maryland, were competitors for the honor of being the first inventor of the reaper, and they differed in the principle just mentioned, each patenting his machine with this specific difference. It is an essential difference, and one which preserves itself to this day. Of the merits or demerits of the one or the other the purchaser must judge, and in making up that judgment these considerations enter into it. The defect in all machines is that in their operation they choke, and thus fail to cut, and stop. This is occasioned by the obstacles which cause lateral pressure, whether that be the weight of the grain cut or irregularities upon the surface, for as the bar recedes the knife for the moment ceases to operate; but the forward motion still gathers the grain into the shears, until the quantity resists the cutting power, and the operation is clogged and stopped. The claim for the machine which does not thus gather up the grain to be cut is, that it is not to the same extent liable to this objection. Whatever may be said for or against the machine which runs upon one or two wheels, there is no such thing as providing entirely against lateral pressure. The McCormick machine runs upon one wheel, while almost all others have two. It is claimed for these that, having two wheels, they have a broader and firmer base, and are therefore less liable to lateral pressure; but this may well be doubted, inasmuch as two wheels capable of moving backward or forward, or one standing while the other moves forward, are more easily affected than one somewhat imbedded in the soft ground.

To avoid the side-draught and induce a steady forward motion is a geat *desideratum*, and for this reason it is well to consider what is the best kind of team to be used. The whole machine is guided by the tongue, and if it can be kept steadily in its course, lateral pressure is thereby avoided. If there be but a single pair of horses used, the point of the tongue is free to sway from side to side, and the cutting-bar necessarily loses its leeway, and while regaining it the operation of the knife is stopped, and the machine consequently clogged. If four horses be used, this renders necessary the double-tree, single-trees, and long trace-trains, the whole keeping up a continued vibration at the end of the tongue which is ill-adapted to steadiness of motion. Three horses, then, would seem to be more appropriate to the attainment of the object desired. One hitched immediately to the end of the tongue, whose power would be constantly used in drawing the machine, would also tend in a greater degree to preserve a steady forward motion.

We have said that there is scarcely any reaper which will not operate successfully in the hands of a skillful manager, but the farmer should not be deceived by such test. Far better rely upon the charac-

ter which the machine has attained from the judgment of skillful mechanics and experienced agriculturists.

With regard to the mower, which is just as useful as the reaper, and perhaps still more profitable, it should not be used as a combined machine. The work to be done differs essentially. While the one may cut a swath of five and a half, or even six feet, the other should not exceed four. The dense, green, heavy weight of grass cannot be successfully cut closely to the ground in a swath of five and a half feet, while the sparse and comparatively dry straw can be readily cut with a stubble of nine inches. One machine badly answers the purposes of the other, and the farmer cannot afford to dispense with either.

Of all the implements for use upon the farm there is no one which tells of greater benefits than the roller. It pulverizes the clods, smooths the surface for the scythe or the reaper, and compacts the earth about the seeds and roots of plants; but above all, and of more importance than all, it destroys vermin. That the earth should be made fine is the object of plowing and harrowing. The roller greatly conduces to this. That small stones and rough places upon the surface should be driven out of the way of the scythe or mower is a *desideratum* which every farmer will appreciate, and when his seed is first sown, or when the frosts of winter and thawing of the spring have loosened its growth upon the surface, it may be imagined how it would be benefited by giving it a bed in the earth again. But its most useful purpose is less satisfactorily explained, for its proof is only found in the experience of its use. All know that most of the vermin which afflicts the farmers' crops has its resting and often its breeding place in the earth. There, and upon the young and tender plant, is where it deposits its eggs. The cut-worm destroys corn at the surface. The Hessian fly deposits its eggs upon the young wheat-blade, which often falls to the ground. The earth, in fine, is fully charged with the eggs and the embryo of vermin of all sorts, in all stages and in all periods of their existence, and it may readily be imagined what an amount of destruction would follow the passage of a heavy roller over the surface. It may be said without the fear of anything but the doubt which inexperience would suggest, that the farmer who constantly uses a roller will never suffer from cut-worm, army-worm, Hessian fly, midge, or any pest which has its origin in the earth.

The construction of a roller is as important as its use. The one in common use is a single log, six, seven, or eight feet in length, fixed in a frame by a gudgeon in each end. This is wholly unfit for the purpose. It is too long to adapt itself to the surface; cannot be turned without shoving the plowed ground into hillocks, and is heavy to haul. The roller should be in sections—how many is a consideration of little moment, provided the number be even—so that, in turning, while one-half goes forward the other half goes backward, and thus rolls all the time upon its own ground. The cheapest and best roller is made of six sections of fifteen inches in width. These sections are made of cast iron after the manner of a wheel with spokes and hub, by which they are strung upon a common shaft fixed in a frame. The wheel turns upon the shaft, which, if it have a support in the center, is well, but it will work well without. This roller may be profitably used upon corn-ground before it is scored out, and soon after the plant shows itself at the surface; upon oats-ground when it is sown; upon oats when four or five inches high; upon young clover in the spring, as soon as the ground is sufficiently dry to allow the horses' feet upon it; upon wheat-ground to prepare it for the drill, and upon wheat in the spring. It cannot be

told with any degree of certainty when it is that the vermin are destroyed, but it is certainly at all times and periods when they are in the egg and embryo. Let it not be said that this costs too much labor. It is labor most profitably spent.

Little need be said with regard to the hay-rake, for its universal use is sufficient evidence of its value as a labor-saving implement. With a single horse and boy it will do the work which once required eight men. The steel-tooth rake has been greatly improved and perfected by the lever for discharging the gathered hay, instead of the old mode by the foot.

The thrasher is a machine necessarily used upon the farm, but does not always belong to it. The one to be spoken of is an implement of the farm, which thrashes but does not winnow and prepare grain for the market, and one which every farmer should own. It is a horse-power machine capable of thrashing about one hundred bushels of wheat per day. The power requires four horses, and the machine five persons to supply and feed it and remove and put away the straw. It is to be distinguished from the thrasher which winnows the grain and imperfectly prepares it for the market at the speed of three or four hundred bushels per day, and involving the employment of a corresponding number of hands. The use of the one is an operation of the farmer himself, the other that of a person whose business it is to thrash for others. The one thrashes the grain as you want it, and allows the storage of the straw and chaff for future use, such as food and bedding for cattle and the consequent making of manure. The other thrashes the whole crop at once, rendering necessary the immediate disposal of it, and giving you an amount of straw which you have no place to put but into stacks or the barn-yard, or to be otherwise wasted, for such a quantity cannot be converted at once into manure, but is greatly wasted upon the desert air. But the farmer's own machine may be used, if properly constructed, for another useful purpose, that of cutting up his corn-fodder. Fodder-cutters, as they are constructed, do not answer well the purpose for which they were designed. They are not quite equal, in point of strength, either in their construction or cutting-knives, to the work required of them. The spikes of the thrasher may be so constructed as to answer both the purposes of thrashing and cutting. They may be made two inches wide, one edge preserving the rotundity of the spike, while the other may have the sharpness of a knife, and by reversing the cylinder you present the knife-edge to cut the fodder into shreds, or the spike-edge to thrash the grain.

Cultivators are as various in their construction as the minds of men. To destroy grass and weeds and loosen the ground between growing plants is the work they have to do, and the simplicity of it points unerringly to the implement which is best adapted to the quality of soil where it is to be used. If the work is to be done with one horse, there is no implement that will do it better than the old-fashioned double shovel-plow. It has the advantage of being always in hand, to be readily guided to the point where its work will be most efficient. If two horses be used, there are other implements which will do the work much more speedily by straddling the row and operating upon both sides of it.

This treatise upon the subject of agricultural implements is induced by a desire to direct the farmer to the choice of those which are best adapted to his particular purpose, and to point out to him the principles which enter into the consideration of the subject, thereby guarding him against the plausible theories and deceptive appearances which so often surround it.

CULTIVATION BY STEAM.

Mr. O. E. Lawrence, of Magnolia Plantation, parish of Plaquemine, Louisiana, responds to a request from this Department for a statement of the results of his trial of the steam-plow, as follows:

Two hundred and twenty acres of my cane crop, one hundred and forty acres of which were plant canes, and eighty acres first-year rattoons, were, I believe, as thoroughly plowed and cultivated by steam as could be desired. The plant canes were grown upon land which, after yielding a crop of corn, was again broken up by the steam-plow 26 inches deep; then, during the winter, laid off in rows fully 8 feet apart and 8 inches deep. In the month of February the cane was planted and covered carefully with a hoe. I avoided carting the seed cane for plants upon the land, carrying it in from each head-land by hand. The seed was good, and was planted in the usual way by laying down three canes in each row. It came up well, giving a perfect stand. In the months of April and May, when the plant cane was about 18 inches high, I subsoiled the crop with my five-tined *steam cultivator* 26 inches deep, twice between each row, working over about ten acres each day. It left the land thoroughly loose and pulverized, and elevated about 6 inches above the level before sub-soiling. This, as the canes began to shade it, was clean and free from grass, and thus was obviated the necessity of giving them at this period of the season any more work, which in ordinary cultivation is always requisite. The cane continued to grow with great rapidity, and on the 10th of June, when it was large enough, and the ground sufficiently settled to bear up the mule-teams, I gave it a thorough plowing with our two-mule plows, following with the hoes, hilling and laying it by. Thus the entire crop, with the exception of this last working, was *cultivated and made by steam.*

On the 1st of September these canes were blown down very flat, from which they only partially rose. They cut for the mill, when rolled in December and January, from 7 to 12 feet in length, and this after being frosted so that we had to throw away the first two joints.

The juice weighed but 6½ to 7 degrees Beaumé; but under the circumstances the yield was over 3,000 pounds of double-refined sugar to the acre, and had the canes stood up until cut for the mill and been as ripe as our canes usually are, I feel satisfied they would have produced over two tons to the acre, and this upon old heavy clay land.

The eighty acres of first year rattoons grown from the stubbles of the *steam-plowed cane*, planted in a similar manner last year, were barred off and well dug in the month of March, then subsoiled and cultivated by steam precisely as the plant-canes. The yield was over 2,500 pounds of sugar to the acre.

Deep steam-plowing upon well ditched lands, I have always believed, would result in an average yield of over 2,000 pounds of sugar to the acre, but this was when I only expected to use the steam-plow in the breaking up of the lands. The use of steam for deep subsoiling in the cultivation of the canes, I confess, has far exceeded my expectations, and I am fully convinced that an average yield of even much more will be realized, and this too with less than half the labor now employed under the old system, in which the average yield is not over 1,000 pounds of sugar to the acre. To this may be added the complete preservation of our stubble canes against the cold and winter rains, so often disastrous to our rattoons.

The advantages of deep plowing and subsoiling by steam over the ordinary cultivation by horses, and the consequent trampling and packing of the ground, can hardly be overestimated. It enables the land to absorb the heavy rains and prepares it for the free admission of air and heat, and thus changes entirely the character of our soils—rendering the heavy clay lands productive and easily worked in seasons of drought, which we are so often subjected to. The crops grown upon deeply-plowed lands sustain no injury. This has been constantly my experience; in fact the steam-plow seems to command the seasons, enabling the soil at all times to retain and transmit moisture, upon which fertility mainly depends. But I fear the prospect at present is not very bright for the extension of steam cultivation in our State. A long war, with the breaking up of the most of our large plantations, the entire destruction of our labor system, followed by scarcity, inefficiency, and high price of labor, and this by a succession of bad seasons, together with enormous taxation, has to a great extent disheartened our planters and paralyzed their energies; and though they have made almost superhuman efforts to restore their estates, yet to-day we have to witness, lamentable as it is, this once great and prosperous interest almost in its last throes of existence. Many of our finest plantations are now abandoned, and offered for sale without purchasers at less than half the cost of the improvements.

Deep plowing; less land cultivated, and that done much better; the introduction of steam-plows and the lands plowed by contract, (where the proprietors do not choose

to purchase,) as is now done with eminent success in England and other countries, and a check to our excessive taxation, would soon restore us. With this every suitable effort should be made and inducement held out with a view to bring to our fertile lands and genial climate, so rich in promise, the enterprising and intelligent emigrant of every nation. Then, as the future surely indicates, will come a division of our lands with the division of our system of labor. The large and costly sugar-houses will be employed as central factories; capital and labor will blend harmoniously together, and, I trust, a new era will dawn upon our now depressed and struggling people.

In justice to the eminent inventors and manufacturers of the double engine steam-plowing tackle and implements, John Fowler & Co., of Leeds, England, I can only say, after three years' experience with two complete sets of their tackle, that the ease and facility with which they are handled, their simple and perfect application of power, and the completeness in every way in which they are worked, entitle them to the high appre ciation with which they are now regarded in every part of the civilized world. And I trust the genius of American inventors, which has been constantly but unfortunately directed to the construction of a traction-engine, moving like horses over the land, with the plows attached, which must continue to be a failure, will soon be convinced that the *double-engine* system, in which two engines upon opposite head-lands, carrying the winding-drum and alternately paying out by single line of wire rope, pull the implement between them, is all that can be desired for the most perfect system of *steam-cultivation*.

Necessity will soon compel us to take a "new departure." The constant increase of emigration and population in the grain-growing States of our country will soon demand a better cultivation and increased production. In England steam plowing has increased the yield of wheat from 16 bushels to 28 bushels to the acre.

I do not believe the agricultural interest of our country can much longer turn a deaf ear to this last and greatest achievement of steam—its successful application to the cultivation of the soil. It has broken the yoke, and lifted the burden which, for ages, held both man and beast in bondage, ameliorating their condition by making that which was most onerous, easy and attractive; it has elevated labor and dignified the plow.

E. LAWRENCE.

NORTHERN AND SOUTHERN FARMING.

In March last a communication was addressed to the Commissioner of Agriculture by the secretary of the Beech Island Farmers' Club, in South Carolina, making certain inquiries concerning the comparative advantages of the different methods of farming at the North and South, with particular reference to the cost and the profits of culture. To this communication the Commissioner responded as follows:

HARRY HAMMOND, *Esq.*,
Secretary Beech Island Farmers' Club, Augusta, Georgia.

SIR: In reply to your letter of the 2d instant, I feel sincerely inclined to give you all the information which I have upon the various points of inquiry which you make. Let me premise, however, that the short experience which you have had does not justify the conclusion that the work of the farm cannot be profitably done by hired labor, with the usual concomitants of a farmer's family. Experience in the Northern and Middle States has taught us otherwise. Farmers there live comfortably, improve their farms, and often grow rich; and with your soil and superior climate there is no reason why you may not do the same thing, especially as the product of your land has a greater money value, acre for acre, than in the Middle States. In answer to your several queries, let me instance an agricultural district in the interior of Pennsylvania, where land is worth about $100 per acre, when improved with house, barn, and necessary out-houses. Such farms will average in size about 120 acres, most of the land being cleared and fenced into fields of about 15 acres. The force that works the farm is generally the farmer and his two sons; or if he has but one, he must have one hired hand, to whom he would have to pay about $20 a month, and board him. It would require six horses or mules to do the work; it would sometimes be done by four; there would be 8 cows and as many young cattle, and sometimes 12 sheep, and perhaps 10 to 15 hogs. Sometimes the farmer will require additional hands, for which he will pay about $1 per day, and in harvest one half more, for raking and binding after a reaper

and hauling in, but not quite so much for hay-making. From this an average product would be:

Wheat, 800 bushels, worth		$1,200 00
Oats, 1,200 bushels, worth		480 00
Corn, 1,200 bushels, worth		600 00
		2,280 00
Deduct from this, of wheat for bread and seed, 150 bushels	$225 00	
Oats for feed and seed, 300 bushels	120 00	
Corn for feed and seed, 400 bushels	200 00	
		545 00
		1,735 00
Pay of one hand	240 00	
Extra hands	110 00	
		350 00
		1,385 00
From this farm there would be realized for potatoes, turnips, fruit, garden vegetables, butter, eggs, and poultry, about		600 00
		1,985 00
All the hay, fodder, and straw are consumed upon the farm; the wool is worked into clothing and blankets; and there will be expended in clothing for family, blacksmith's bill, and repairs of farm, &c		985 00
Leaving a cash balance of		1,000 00

Now this is an account of the operations, practically, of a thrifty farmer, who understands his business. He takes his breakfast, and has his horses fed, geared, and watered, that they may be in the field at sunrise. He gets his dinner about 11 o'clock a. m., and is in the field again by 12 o'clock, and quits work about sundown.

What it costs to break up an acre of ground, no one can answer; nor would an answer be of any value. And the same may be said of the cost of planting an acre of wheat or laying an acre of corn. These are items in the business of a farm which cannot be aggregated for any valuable conclusion, nor can it be told how much it costs to put up 100 feet of fence. As to all these things, so many circumstances exist as to render any truthful estimate at one point wholly inapplicable to another. It is undoubtedly true that a hired laborer at the North will do double as much work in a day, as a black man will do in the South. This is doubtless attributable to the fact that the one has been educated to work, because to earn his wages he must; the other to avoid labor, because his compensation was the same whether he worked or not. This will not always be so, for the time is coming when free labor will produce about the same results everywhere. There are many colored laborers in the Middle States whose capacity for labor is quite equal to that of the white man, and who earn the same amount of wages.

If farms are leased to tenants, they pay the road and school taxes, and the landlord the county taxes. Each finds one-half of the seed, and receives one-half the products, all hay, straw, and fodder being used upon the farm.

About one-third of the land will be put into wheat, and one-third into corn and oats, and the remainder into grass; and it is becoming a common practice, and a good one, to turn no cattle out to pasture until after the grass is cut and the hay made. This grass is of mixed clover and timothy, the latter sowed in the fall with wheat, and the former in the spring, after which the field should be rolled for the double purpose of embedding the clover seed, and making smooth the ground for the greater convenience of reaping the crop.

When the wheat crop is taken off, the young clover should not be pastured much, and it would be better if not at all. The next year's hay is here made; and at this point one of your difficulties occurs. You have no barn to put it in, and I am aware that it would be difficult to convince you that you have any necessity for one. You persuade yourselves that your climate is such that cattle do not require shelter. This is to be unmindful of the fact, that this is the least important function of a barn. In the South 15 per cent. of your products is wasted in cutting, gathering, stacking, and thrashing, while it should be hauled in good time and stowed away in a barn, where you may thrash it at your leisure, and feed your hay, fodder, and straw to your cattle, which would thereby be employed in manufacturing materials into manure that would otherwise be comparatively lost in the exposure to rain, sun, and wind. If cattle be kept in a barn and its yard, from the fall until the following June, and during May and June fed with grass cut from the fields for them, they will have used up all the

hay, fodder, and straw, and manufactured it into manure that will be sufficient for 20 acres, and this should be put upon the clover sod, preparatory to corn planting the following spring; for which purpose the ground should be deeply plowed, so as to put the manure beyond the reach of a shallow plowing for oats the following spring. When this crop is taken off, then plow deeply for wheat, so that the manure may be thoroughly mixed with the soil, and in a proper condition for the following wheat crop. This rotation, or an equivalent, is absolutely essential to successful and profitable farming.

Southerners are peculiarly an agricultural people; and yet about their farms there is a manifest indifference and carelessness about their condition. The fences are broken down, gates out of order, buildings out of repair, and implements lying around. It cannot be expected that the employés shall be diligent and systematic in the midst of disorder and confusion any more than a mechanic should perform his duty with indifferent or dull tools or a careless employer. It is easier and less expensive to have things in order. With neatness and care, there is a spirit of pride and emulation which enters into the actions of every man and woman employed, and diffuses itself into all the operations of the farm, to the great profit of the farmer.

Before I close this letter, which has been written hastily and amid very much interruption, I desire to commend to your attention the use of lime. It is one of the large constituent properties of grass, especially clover, without the use of which no successful farming can be accomplished. Clover is a grass, too, which of all others will endure heat and cold. Nature has given to it a tap-root, which enables it to seek moisture and protection to a greater extent than many other grasses the roots of which are much confined to the surface.

I trust I may have given you some useful hints about farming. I did not intend to do more.

Very respectfully,

FREDERICK WATTS,
Commissioner.

This letter was referred for consideration to a committee of the club, who subsequently submitted the following report, a copy of which was courteously transmitted to the Department:

Report to the Beech Island Farmers' Club on a letter received from Hon. Frederick Watts, Commissioner of Agriculture.

Your committee have read the letter of Hon. F. Watts, referred to them, with great care and interest. Mr. Watts draws our attention to the fact that "our short experience" does not justify the conclusion that the work of the farm cannot be profitably done by hired labor; and after stating that farmers in the Northern and Middle States "live comfortably, improve their farms, and often grow rich," continues: "With your soil and superior climate there is no reason why you may not do the same thing, especially as the product of your land has a greater money value, acre for acre, than in the Middle States." Of the correctness of this view there is not a reasonable doubt. We have had our days of gloom, and it would hardly be candid not to admit that there is some discouragement and anxiety still. But we cannot fail to recognize the important fact that failures, where they have occurred, came from causes which lie mainly outside the provinces of legitimate planting. Neither our soil, our climate, our products, (the money value of our great staples in the market,) nor our labor, can fairly be taxed with them. In reference to the latter, it is only fair to the negro (the chief laborer) to state, that away from the towns and villages and the malign influence of politics, as a rule, whenever fairly treated, he has been docile, steady, and effective, comparing favorably, we believe, with hireling laborers elsewhere, and unquestionably the best workers in our cotton-fields. Mr. Watts' statement that "it is undoubtedly true that a hired laborer at the North will do double as much work in a day as a black man will do in the South," is a popular notion there and here, but one, we believe, that could hardly be sustained by facts. In many kinds of labor, incident to small grain and grass culture, rearing stock, and managing the more complex agricultural implements, the negro has little practice, and therefore possesses little skill. But he is a good plowman, following the team as far as it ought to be driven in a day, and doing well, not only the coarser work in the preparation of the soil, but also the more delicate manipulations required by the young plant. And with the hoe, the chief implement in cotton culture, he has, from long training, acquired celerity, precision, and in short, efficiency, which the laborer of any other country would find it hard to rival. To get full work from him it is necessary for him to feel that his pay is sure, and a part of it at least in some shape directly before him, and to thoroughly understand that the amount of work will be required of him, and that he can and ought to do it; which doubtless, are about the only

conditions under which full work is got from the hired laborer anywhere. We quote the following passage entire from Mr. Watts's letter, and commend it to the careful attention of the club. It exposes the chief defect in the training and habits of the southern planter, to which may be traced a large share of his troubles: "Southerners are peculiarly an agricultural people, and yet about their farms there is a manifest indifference and carelessness about their condition; the fences are broken down, gates out of order, buildings out of repair, and implements lying around; it cannot be expected that the employers shall be diligent and systematic, in the midst of disorder and confusion, any more than a mechanic will perform his duty with indifferent or dull tools or a careless employer. *It is easier and less expensive to have things in order.* With neatness and care there is a spirit of pride and emulation which enters into the actions of every man and woman employed, and diffuses itself into all the operations of the farm, to the great profit of the farmer." These remarks are worthy of consideration. We all assent to them, but something more than this is necessary. We must take the truths they convey, and carry them home with us, and set about at once conforming our daily practice to them. Permanent success can only be assured by careful, unremitting, systematic, vigilant attention to details. Without that, no amount of general information, or of intelligence, or of energy, can gather the fruits of labor, but again and again we will find ourselves robbed of the best results of enterprises, however wisely planned and energetically pursued.

But while we unquestionably need to cultivate more orderly and systematic habits of attending to details, and there is vast room for practical improvement about our plantation buildings, fences, &c., it is not necessary, and would hardly be prudent for us to emulate the prim neatness of the New England or Middle States farmer. Our planting is done on a much larger scale and under very different conditions. Their handsome barns, neat brick out-buildings, painted yearly, multiplicity of expensive stone fences, &c., are no more essential to us than are the decorations of the fancy store to the wholesale grocery.

A large and not the least interesting portion of Mr. Watts's letter is devoted to a minute account of the operations of a thrifty northern farmer. It is especially interesting to us, in enabling us to compare the results of farming here with those obtained under favorable circumstances elsewhere. An improved farm is instanced, of "about 120 acres," in the interior of Pennsylvania, worth about $100 an acre, or $12,000. It is stocked with 6 horses or mules, (the work would sometimes be done by 4,) 8 cows and as many young cattle; sometimes 12 sheep; 10 to 15 hogs; and the force which works is generally the farmer and his two sons, or if he has but one, he must have one hired hand. Adding the value of the stock, of the necessary supplies, outfit in wagons, carts, implements, seeds, &c., and ready money required to carry on the work to the original cost of the farm, we will find the investment to be probably between $16,000 and $17,000. The money value of the gross products of this farm in wheat, oats, and corn, is placed at $2,280, to which must be added $600 realized for potatoes, turnips, fruit, garden vegetables, butter, eggs, and poultry. All the hay, fodder, and straw, are consumed on the farm; the wool is worked into clothing and blankets, and after providing bread and clothing for his family, feed for his stock, and paying for blacksmith's work and repairs of farm improvements, &c., a net cash balance is left in the hands of the farmer of $1,000. This we are told is the result of the operations of a thrifty farmer who understands his business. He takes his breakfast and has his horses fed, geared and watered, that they may be in the field at sunrise. He gets his dinner about 11 o'clock a. m., and is in the field again by 12 o'clock, and quits work about sundown.

There is evidence here of care, industry, and economy; but the results are not such as might safely be calculated on in planting in the South with equal care and industry and equal capital. Sixteen or seventeen thousand dollars would not have enabled one to plant largely before the abolition of slavery, when to get the labor it was necessary to own the laborer. But there has been a great revolution in this respect, and now a judicious investment of that amount, going wholly even upon the cash system, would place one among the larger planters. We will instance a plantation of 800 acres, among the better class of uplands in a healthy locality in Edgefield or Barnwell Counties of this State, or the adjacent counties in Georgia, about which we can speak with authority and accuracy from our perfect familiarity with them. Supposing this place to have the usual improvements, with 500 acres of cleared land and 300 in the woods, and labor secured and work commenced early in January, the following figures will show about how the investment should be made, and what results could be obtained the first year:

CASH OUTLAY.

800 acres land	$8,000
10 mules	1,750
2 wagons	300
3 carts	150

2 yoke oxen	$150
1,000 bushels corn	1,000
Gear and implements	300
Guano	900
Seeds	150
Wages, 22 hands	2,200
Feed, 22 hands	550
Extra labor	400
Total	15,850

CROP.

Cotton, 250 acres, 100 bales	$10,000
Corn, 150 acres, 1,500 bushels	1,500
Oats, 25 acres, 375 bushels	300
4,000 bushels cotton seed	600
Total	12,400

ASSETS.

800 acres land	$8,000
10 mules	1,600
2 wagons	200
3 carts	100
2 yoke oxen	125
Gear and implements	100
Total	10,125

Assets	$10,125	
Crop value	12,400	
		$22,525
Cash outlay		15,850
Balance		6,675

Forage is not taken into account, because enough should at least be made to meet the demands upon the place. Neither is any estimate made of family expenses, which would vary indefinitely, according to the tastes, habits, and circumstances of the proprietor. All the fruits and vegetables in their season might easily be had; while with diligence and care milk, butter, poultry, eggs, and even pork, mutton, and beef, sufficient for family use, could be added to the products of the plantation, almost without an appreciable increase of expenditure.

It will be seen that cotton is valued at 20 cents per pound; it is now worth about 22 cents in the home markets, and the net profits of the plantation vary $500 with each fluctuation of a cent in the price of cotton.

Production is placed in the above calculation at a little less than 5 bales to the regular hand, or a little less than 4 bales to the hand, counting in the extra labor; and it is worthy of notice that the net profits of the business are increased $2,200 with every increase of one bale per hand. The average production here is probably 3½ bales per hand, while successful planters make 4, 5, and even 6, and occasionally we hear of 8 and 10. Does agriculture offer anywhere else such great rewards for intelligent and persistent effort? In evidence of the fact that the results of the above calculations are clearly within the limits of what may be done, we give here statements of the crops actually made and gathered last year by members of this club:

Mr. Page, from 18 acres of improved upland planted in cotton, obtained in money $2,150. His entire crop, with 5 hands and 5 mules, was 19 bales of cotton and 2,400 bushels of corn, besides peas, pumpkins, sweet potatoes, and forage and 4,000 pounds of pork. This plantation was bought by Mr. Page five years ago for $4,000 in currency.

Mr. E. S. Hammond, on a poor quality of upland worth $6 per acre, (recently bought for that,) worked two hands and two mules; money value of cotton, corn, hay, and sweet potatoes, $1,600, besides 1,500 pounds of pork, and fruit and garden vegetables in great abundance.

Mr. G. B. Mills, on medium upland, worked three hands and made 21 bales of cotton, corn and forage in abundance, and 500 bushels of sweet potatoes.

Mr. B. T. Page, managing for Mr. Barny Dunbar, worked thirty hands, and made 161 bales of cotton, 3,000 bushels of corn, 400 bushels of peas, besides forage, sweet potatoes, vegetables and fruits in abundance, and killed 7,500 pounds of pork. The plantation on which this crop was made was bought two years ago for $9,700 in currency.

If, then, cotton culture is so profitable, why, it may be asked, are cotton lands so cheap, and why have not cotton planters grown rich from the six crops made since the war? These are pertinent questions, and we will answer them briefly. Land is cheap because it is superabundant and out of all proportion to labor and capital. Our capital was destroyed by the war; and capital has not come here from abroad for permanent investment, partly on account of ignorance concerning the profits to be derived from its employment here, and partly from an old-time prejudice against the South, but mainly from the sense of insecurity arising from the universal impression that our State governments have been inclined rather to plunder than to afford adequate protection to property.

It is one thing to make money and another altogether to accumulate wealth. That cotton planters have made money there is ample evidence to show in their yearly production of cotton to the value of nearly $300,000,000. But why have they not grown rich? When the war ended there was an almost universal disbelief in the possibility of making cotton with free negro labor. Those who first undertook the experiment did so with great distrust, and proceeded with the utmost caution, practicing a rigid economy. The result was that despite a very bad season and a short crop, the crop of 1866 was probably the most profitable ever grown in the cotton States.

The fact demonstrated that cotton could be made, and that cheaply, with free negro labor, and the staple fetching three times its former price in the market the prospect seemed golden. Those who had already been at work sought to double their operations; and others, of all classes and employments, rushed into cotton-planting. The cotton which had gone forward enabled the merchants to re-establish, to some extent, their credit at the North, and obtain money there which they in turn advanced, often recklessly, to those who sought their aid, but at exorbitant rates of interest. It was not uncommon for men without capital to rent land and get advances from factors at 25 per cent. or more interest, on simple pledge of a crop not yet in the ground, to buy stock and outfit, provisions at hitherto unheard-of prices, and large quantities of commercial manures. The most extravagant expectations were indulged, and the most extravagant measures adopted. In short, the country was run mad; traders, merchants, planters, all were making haste to get rich. The crop, notwithstanding all this expenditure, was not a good one, while large estimates were entertained of it in all the great cotton markets, and the price ran down before the close of the year to 13 cents per pound. Planter and factor fell together; thousands of both classes had to give up their business altogether, and the whole country was brought to the verge of bankruptcy. Clearly this disaster could not have followed as the result of legitimate planting, but was brought about by the wildest speculation.

Fortunately there was a large and rapid rise in the price of cotton in the months of January and February, 1868, which enabled those planters who were not utterly broke to get enough money from the remnants of their crops to go on on a more moderate scale. There was a return to the ways of prudence and economy and sober work, and the crop of that year was a remunerating one. So also was that of 1869. But 1870 was a repetition of 1867; the same extravagance, similar results; thousands ruined, all former profits swept away, and a burden of debt incurred. It was not planting; it was speculating. Again, in 1871, care and economy bore their lawful fruits, and in spite of a bad season the crop paid well. Cotton-planters, forced by their crippled condition to a prudent and economical management of their affairs, have made four profitable cotton-crops; and two, when tempted by success and the hope of getting rich all at once to disregard the only certain conditions of success, which neutralized the results of the other four. It may be hoped that a severe experience will prevent them from being again deluded into speculative planting. With patience and prudent, sober, and steady industry, and such protection from the honest administration of just and equal laws as every government owes to its citizens, a career of prosperity is open to the South not surpassed by anything in her former history.

PAUL F. HAMMOND,
WM. PINCKNEY STARKE,
WM. H. ATKINSON,
Committee.

In reference to this report, the Commissioner addressed to the club the following letter:

WASHINGTON, D. C., *August* 7, 1872.

SIR: The letter of your recording secretary, communicating to me the report of a committee of your society, to which was referred my letter on the subject of "Southern planting," has reached me, and I cannot forbear the expression of the pleasure which its perusal has afforded. It was with no unmeasured degree of hesitation that I ventured to treat the subject at all, because I felt that it was the discussion of that

which must have undergone the deliberation of able minds, whose promptings of interest would impart a practical discernment which I could not claim for myself. I am the more pleased, therefore, that I am not charged with the fault of arrogating to myself the right to make suggestions which I believed might, at least, lead to a profitable discussion. Your committee has given it that turn, and I feel sure that southern planters will be much edified by the dispassionate and very sensible views which have been thus so clearly expressed. I will take care that their opinions shall not be lost.

This Department is not unmindful of the condition of the southern people, and it is in no spirit of exultation that we declare its purpose, in the exercise of its legitimate powers, to aid those who most need all its information and the benefits it has to bestow.

I note the remarks made in the report on the subject of the size of farms, and am not at all surprised at its reckonings, for your early teachings run thus; and you will be no more surprised at the expression of my conviction, that one-half of 800 acres, under proper cultivation, and with far less labor, will make a greater product.

If southern planters will believe and act upon the fact that there is an element of fertility given to the soil by a proper rotation of crops, which no amount or quality of applied fertilizers will long continue to supply, they will be greatly benefited. You may make the earth drunk with applied manures and stimulants, but it is a drunkenness which stimulates to ultimate exhaustion and death.

I am, very respectfully, your obedient servant.

FREDK WATTS,
Commissioner.

DR. H. B. COOK,
Corresponding Secretary of Beech Island Farmers' Club.

In the rejoinder of the club to this letter of the Commissioner, the corresponding secretary says:

Your letter in response to the report of our committee is so kindly complimentary, and expresses such generous sentiments toward our people in their present exhausted condition, and coming from so distinguished a source, that I beg leave, in the name of our society, to return you our very warm thanks for the same.

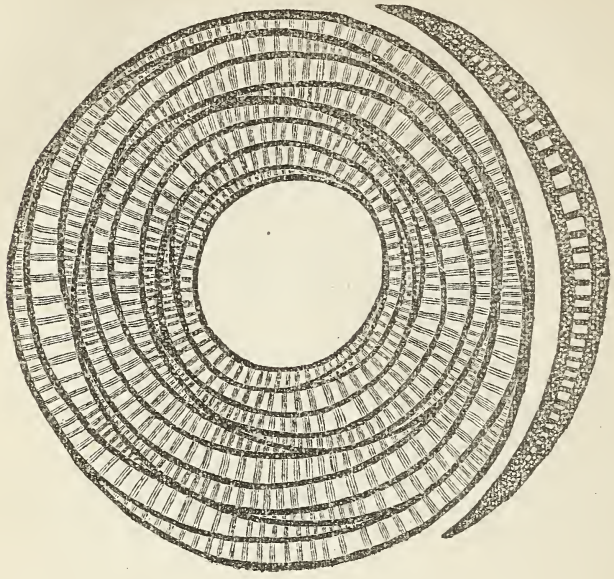
THE MANILA HEMP PLANTAIN.

Mr. William Grange, of the Imperial Ottoman consulate, Baltimore, has sent to this Department the following communication, forwarded to him by a resident at the Philippine Islands, who is thoroughly conversant with the subject:

The hemp plantain, (*Musa troglodytarum textoria,*) called by the natives of the Philippine Islands abaca, is a species of the genus *Musa*, growing wild all over the islands. It yields a small, inedible fruit, in appearance like that of the ordinary plantain. The trees attain a height of 20 to 30 feet; grow wild, but are usually cultivated in groves, in which they are placed 3 to 4 feet apart. The mode of cultivation is rude, consisting simply in keeping the groves free from weeds and noxious plants. At the age of three years the tree has attained its growth, and is fit to be cut down. After its fruit has ripened, the tree will not yield any hemp. It is the stock or trunk which furnishes the fiber. After this has been cut, there springs up from the same root a number of trees, at intervals of a few months, so that a well kept grove can be cut about twice a year. The tree is cut a few inches above the ground. The inclosed diagram displays the formation of the trunk, which, it will be seen, is composed of over-lapping strips, or layers. These strips are separated from each other after the trunk has been trimmed of its branches. The strips are from 3 to 4 inches wide, and from 5 to 10 feet in length, according to the length of the trunk. The strips are next sub-divided into narrower ones, and drawn by hand over a knife, the strip being pressed upon the knife by an underlying piece of hard wood, and the tension managed by a treadle. This operation cleans away from the fibers the watery and fleshy parts of the plant, and it only remains to dry the fiber in open air when it is ready for market. It is necessary to pass the strip over the knife twice or thrice before the fibers are left perfectly clean throughout the entire length. One man at the knife and one to cut down the trees, transport them, and separate the strips, will clean about 25 pounds per day, though this is rather above the average. From 150 to 200 trees are needed to produce of fiber one picul, (137½ pounds Spanish,) or 140 pounds English; 3,200 trees for one ton of 2,240 pounds.

When we consider the small amount of hemp which an Indian produces per day, about 12 pounds, we are astonished at the enormous quantities of it exported from the East, to England in particular, reaching many hundred thousand bales annually,

with yearly increasing proportions. At the rate mentioned above, 12 pounds per day, and allowing three hundred working days in twelve months, one man could only produce about 1½ tons; and for 500,000 bales, or, perhaps, 200,000 tons, it would require the constant labor of about 150,000 men all the year round. Nor can we sufficiently



wonder at the extraordinary low earnings of these Indians—not exceeding the price in the islands of his half-share of the hemp, namely, 6 pounds, worth there about 18 cents. And yet, this insignificant pittance suffices for the wants of himself and family.

This variety of hemp plantain is unknown in the United States. If some specimens were to be imported and propagated, it might become a source of immense profit in the Southern States. No species of the genus *Musa* examined in the South, or South America, posseses the manilla fiber. The plantains of this continent are too watery to allow of the formation of useful fiber in the trunk.

The writer calls attention to the importance of inventing an effective machine for separating the fiber. He states that such an invention, in order to be of value to the islanders, must combine cheapness, simplicity, and portability, with economy as compared with their hand-process. There are no slaves in the islands. According to established custom the laborers work either on shares, or as small proprietors. If a machine is costly, they cannot buy it; if it is complicated, there is not the requisite skill either to work or to repair it; if it is not light and easily moved, there are not facilities for transporting the hemp-trees to that, or that to the hemp-trees; and if it cannot be worked economically, there is no advantage in it.

ENTOMOLOGICAL RECORD.

By Townend Glover, Entomologist.

Beetles in decaying peaches.—Mr. Richard H. Day, Baton Rouge, Louisiana, wrote to the Department July 8, inclosing a specimen of a beetle that he had reared from infested branches and fruit of the

peach, and, according to his letter, the entire leaves and fruit put up in the bottle were literally devoured when he removed them. He also stated that the peach crop was rotting badly before maturity, and asked if the insect could have connection in any way with this condition of the crop.

In a letter written August 19, however, he says that "although numbers of my trees show evidence of disease, it certainly cannot be traced to the ravages of this insect." He further states that "the ravages of the insects were first noticed last spring in going through the orchard to prune." His attention was attracted by the great number of small branches dead and dying since the spring's growth had started, and upon tracing those branches down, he invariably found in the branch at the base of the leaf a puncture covered over with dried gum. Sometimes the puncture was so recent that only the first leaf above was dead or dying, but death always followed the branch from the puncture up to its extremity, and almost as invariably traveled down till it came to a lateral branch, where the poison seemed to be arrested. It was observed that these punctures were always either in the tender wood of the preceding fall's or present spring's growth.

He examined many of the diseased branches with all possible care, and though he was unable to find either insect or eggs, he was satisfied that the injury could be traced to insects, and so a number of specimens of twigs, or terminal shoots, were forwarded to the Department. These were carefully examined, and no eggs or insects could be discovered in the twigs. Mr. Day was advised, however, to put a number of injured specimens in a glass jar, and watch them carefully to see if any insects came out of them. This he did, but placed some twigs with young fruit on them. After watching them for a number of weeks he paid no further attention to them, supposing the insects had all escaped before he placed the branches in the jar; but later in the season, having occasion to use the jar, he found a number of small beetles, and discovered to his surprise that the leaves and fruit were nearly eaten up. One of these, the others escaping, he sent to the Department for identification.

On the 29th of August he wrote again to the Department, stating that he placed four specimens of diseased peaches in an empty quinine-bottle, with a view of determining whether his opinion was correct "in ascribing this general and wide-spread disease of peaches to the depredation of insects, and also whether this insect is the same as the one that commits its ravages upon the tender branches of the trees in the spring."

Fig. 13.

On the 27th of the month the first beetle appeared from this lot of specimens, and he subsequently sent the bottle, with peaches and insects inclosed, to the Department for examination by the entomologist. On examination, these beetles were decided to be *Arœocerus* (Sch.) *coffeæ* of Fab., and the shriveled peaches sent were literally riddled by their larvæ, a specimen of which was sent in June, and is figured, (Fig. 13.) Six perfect beetles made their appearance from the three specimens of the dried fruit last forwarded; but the insect first mentioned as attacking the twigs in spring, is most probably another insect, and may prove to be the *Anarsia pruinella*, of Clemens, mentioned (with figures) on page 305, of the monthly report for July, as having injured peach-twigs in Maryland.

Another season, however, will decide the question, if Mr. Day, or any of our correspondents in Louisiana, or elsewhere, will send specimens

of the twigs, as soon as injured in the spring, when one may be able to detect the insect. It appears to us that the *Arœocerus coffeæ*, would not be likely, in the larvæ state, to injure living healthy twigs in the manner described. The insect, however, may probably be found under the bark of diseased trees, and there is no doubt whatever that, in the larvæ state, it attacks partially rotten and shriveled fruit, as proved by the worm-eaten appearance of the specimens sent.

Worms in Peach-Trees.—A correspondent of the Department, when examining his peach-trees for the peach-tree borer, discovered a great quantity of small whitish worms, about the 0.40 of an inch in length, and of a very slender form, swarming in the exuded gum, sawdust, and feces with which the mouth of burrows made by the peach-borer (*Ægeria exitiosa*) were filled. These small worms he considered the young larvæ of the borer, and sent them to the Department for examination; they were carefully placed in a bottle and fed until they changed into naked pupæ on the surface of the earth, or a little below it; and in about eight or ten days after the pupæ were fully developed, the perfect insects made their appearance in the form of minute two-winged dark-colored flies, which were at once recognized as the *Mycetobia* (*Mycetophila*) *persicæ*. Several of this genus feed upon fungi, and one species, very similar, is mentioned by Dr. Packard as living in the putrescent sap under the bark of elm trees. Our correspondents, however, have no occasion to apprehend any injury from this insect, as it only appears to feed upon the exuded gum, &c., and has nothing to do with the larvæ of the peach tree borers, which, even when very young, can be readily distinguished by their heads, their more robust forms, and by their six small feet on the first three segments of the body—while the larvæ of the *Mycetobia* is long and snake-like in form, and has no feet whatever, and is perfectly innocuous to the peach-tree.

Fig. 14.

Note to Correspondents.—Owing to the very imperfect descriptions given by some of our correspondents of the insects sent to this Department for examination and identification, it is hoped that hereafter they will either describe them more fully, or, what is much better, send specimens of the insects themselves by mail, so that the entomologist may be able to identify them. Soft-bodied larvæ may be sent alive in small tin or wooden boxes with some of the plants they feed upon inclosed, or if dead they may be placed in vials of weak alcohol. All beetles, plant-bugs, and hard-bodied insects may also be placed in alcohol, though the bottle must be protected from breakage, if sent through the mail. Butterflies, moths, &c., may be killed by a slight pinch on the thorax, and may then be sent folded in envelope corners or triangular slips of paper. Where there are a number of these papers they may be conveniently packed in tin or small wooden boxes. All packages should be addressed to the Commissioner of Agriculture, and will then come free by mail if not over two pounds in weight.

It is also hoped that our correspondents will particularly mention what remedies are used in their neighborhood, and with what success, in destroying our most common noxious insects, such as the wheat-fly, Hessian-fly, chinch-bug, army-worm, Colorado potato-beetle, &c. It would also be well for southern planters to make a specialty of report-

ing the success they have met with in applying remedies for the destruction of the cotton-worm or fly, and the boll-worm, or if any means whatever have been used in their neighborhood to destroy them, and what they recommend.

INSECT INJURIES.—In a few localities in Rhode Island and Connecticut our August returns present injuries to oats, sod-corn, and grass crops by the army-worm, (*Leucania unipuncta*,) and the white grub, (larva of *Lachnosterna*,) with the occasional presence, in the fruit, of the canker-worm, (*Anisopteryx vernata*.) In King's County, New York, complaints were made of the cabbage-worm, (probably *Pieris rapæ*.) Cut-worms (a species of *Agrotis*) injured the corn crop in Armstrong and Lycoming counties, Pennsylvania. From Middlesex County, Virginia, come reports of the bud-worm, (a local designation not recognized.) In Mecklenburg County some annoyance was created by the chinch-bug. [*Micropus* (*Rhyparochromus*) *leucopterus*.]

Extensive injuries to cotton by insects are reported in nearly all the cotton States. North Carolina, however, has been nearly exempt from this infliction, but a single mention of "insects in cotton" coming up from Pasquotank county. The August crops of Richland county, South Carolina, were generally swept by the cotton caterpillar or cotton army-worm, (*Anomis xylinæ*.) In Georgia the ravages of this insect are reported in Lee, Marion, Glynn, Stewart, Clay, Glasscock, Calhoun, Schley, and Baldwin counties. In some places the destruction was complete. In Schley County fields were entirely denuded within forty-eight hours after the appearance of the enemy. In Glasscock and Marion the boll-worm, (*Heliothis armigera*,) added its destructive influence. In some localities the grass caterpillar or grass army-worm, (*Prodenia autumnalis*,) devoured the corn, grass, and pea crops.

In Suwannee County, Florida, cotton caterpillars appeared July 15, and within a month entirely swept many fields. In Leon they appeared August 18, and within a week the last cotton leaf had disappeared. The same report comes from Taylor county. In Jefferson the third brood was in process of incubation. Similar complaints come from Gadsden, Marion, and West Florida generally. The grass caterpillars were numerous and active in Columbia and Manatee.

Our August returns from Alabama foreshadowed an extensive visitation of the cotton caterpillar, which, as our September reports show, was fully and painfully realized. In some places the boll-worm vied with the cotton-worm in its destructive influence. Reports of either or both of these pests come from Macon, Clarke, Pike, Marengo, Conecuh, Perry, Montgomery, Crenshaw, Russell, Fisk, Calhoun, Chambers, Butler, Autauga, Dallas, Wilcox, and Tuscaloosa Counties. In Crenshaw entire fields were denuded of foliage. In Calhoun the crop prospect was reduced 25 per cent. in five days. In Autauga the roads, woods, and wells were full of army and boll worms. In Wilcox the caterpillars, after stripping the cotton plant of its leaves attacked the bolls, eating the smaller ones and killing the larger ones by gnawing around them. In Perry the crop was cut down to half an average after August 20. In Fisk the boll-worm was also destructive in corn-fields.

In Mississippi the injuries reported by our correspondents, though less extensive than in Alabama, were quite considerable. Persistent efforts for the destruction of cotton insects appear to have been measurably successful in several counties. Reports of injuries come from Pike, Jasper, Newton, Clarke, La Fayette, Wilkinson, Warren, Smith, Attala, Lauderdale, Wayne, Hinds, Madison, Neshoba, and Yalabusha.

In some of these counties the damages were slight; in others entire fields were denuded of leaves.

In Louisiana the cotton-caterpillars, after several ominous demonstrations in July, appeared in force in several counties during August. They nearly "finished" the crop in Tangipahoa, and reduced that of Marion to a half average. In Concordia many fields were entirely stripped of foliage. Severe injuries were inflicted in Red River and Saint Landry, while insects in formidable numbers were reported in Cameron, Carroll, Union, Rapides, Avoyelles, Baton Rouge, and Caddo. In Baton Rouge they were very annoying to peach and grape growers. In Orleans County truck-farmers suffered from the ravages of a large black grasshopper, (*Romalia microptera.*) This insect has been known for forty years, appearing in May along the South Atlantic and Gulf coast. Heretofore it has been comparatively harmless, but this year it was very injurious to melons and vegetables. It also climbed peach and fig trees to devour the fruit. It cannot fly, its wings being too short.

In Texas serious damages to the cotton crop are reported in Austin, Gonzales, Atascosa, Matagorda, Milam, and Blanco Counties by cotton-caterpillars, grasshoppers, and an undescribed insect. In Gonzales County grasshoppers also inflicted great injury upon bottom crops of corn.

In Jefferson County, Kentucky, pears suffered from the depredations of the locust, (*Cicada septendecem.*)

In several counties north of the Ohio River the Colorado potato-beetle (*Doryphora decemlineata*) was quite active. In some cases its depredations were serious, while in others they were successfully resisted by remedies. Infusions of Paris-green, dog-fennel, and May-weed are reported as quite effective in different places. The general opinion appears to be that these insects were not nearly so numerous or destructive as in former years. Similar reports come from Minnesota, Iowa, and Missouri. In Pulaski County, Missouri, the disappearance of the beetle is attributed to the destruction of its eggs by the lady-bug, (*Coccinella,*) which appeared in great numbers. In Nebraska the Colorado beetle was more annoying, its ravages being quite severe in several counties. In Boone County the "old black potato-bug, enlarged and improved," was quite a nuisance. This was, probably, the *Macrobasis albida*, specimens of which have been received by the Department, with the statement that they devour not only potatoes, but several other vegetables. From the same locality come reports of a large round beetle, with faint stripes along its dusky back, which has been very destructive. The terms of description suit several destructive insects, and hence are insufficient to identify the one in question. In Republic County, Kansas, the "old-fashioned" potato-bug (*Cantharis cinerea*) greatly injured potatoes and beets. The Colorado beetle was also annoying in Helena County, Montana. In Iron County, Utah, potatoes, beets, and corn were destroyed, to a considerable extent, by a dark-green worm, an inch and a half in length, not yet identified. Our correspondent says that the ground was literally covered with these worms.

The chinch-bug did some damage to Australian wheat in Pulaski County, Indiana. In Kankakee County, Illinois, it seriously damaged corn and oats. It was also quite destructive in Mahaska, Marion, and Lucas Counties, Iowa, and inflicted greater or less injuries in Harrison, Nodaway, Crawford, Washington, Jefferson, Moniteau, Sullivan, Reynolds, and Phelps Counties, Missouri. In Wilson and Jefferson Counties, Kansas, this bug was very destructive on wheat, especially the

white Australian. In Sage County, Nebraska, its ravages are also reported.

The army-worm injured the cereal crops considerably in Grundy and Livingston Counties, Illinois. In Jefferson County, Iowa, it devoured the meadows. Its mischievous presence was also felt in Hall County, Nebraska.

In Lucas County, Iowa, grape-vines were much injured by an insect which, from imperfect description, is supposed to be the *Bostricus bicaudatus*. Specimens of this insect have been sent from this locality to the Department, with statements of its habit of injuring grape-vines by boring into the wood.

West of the Missouri River grasshoppers (*Caloptenus spretus*) were quite mischievous in some localities. In Ottawa County, Kansas, they appeared August 15, and for three days wrought havoc in the corn. They did great mischief, also, in Madison and L'eau-qui-court Counties, Nebraska. In Bonhomme County, Dakota, they appeared August 10, and remained two days, partially destroying the corn crops. In Morgan County, Utah, they were so numerous as to prevent the sowing of buckwheat. In Columbia County, Oregon, they made great havoc of grass and grain crops, scarcely leaving a trace of clover, and then attacked gardens and fruit-trees.

CHEMICAL MEMORANDA.

By Ryland T. Brown, Chemist.

Laboratory Work.—The laboratory, since the last report, has been engaged chiefly in the investigation of marls, the first section of which investigation we have already reported. The analyses here presented may be regarded as a fair average of the shell and green-sand marls of the Atlantic border, not including, however, the phosphatic beds of South Carolina. It will be observed that while these marls are generally rich in lime and contain a fair proportion of phosphates and alkalies, yet they are deficient in organic matter, or the means of furnishing the nitrogenous materials of plant food. In soils where the exhaustion has not extended to the organic matter, or where the vegetable mold has been well maintained by turning under clover or other green crops, these marls will supply all the demands of growing vegetation under ordinary circumstances. But where these conditions are wanting, the marls will disappoint the farmer who depends on them alone. It will always be safe to use them in conjunction with stable manure or some other nitrogenized fertilizer. The lime in these compounds exists chiefly as a carbonate, and where the per cent. of this mineral is high the marl will be rendered more active by being burned; but the economy of burning marl at any place will depend on the price of fuel.

Two samples of marl from Prince George County, Maryland, furnished by Frederick W. Poor, gave on analysis the following results:

No. I.—*Shell marl.*

Moisture	2.600
Lime	32.910
Carbonic acid	26.429
Iron and alumina	4.160
Silica	33.901

Phosphoric acid	Trace.
Magnesia	Trace.
Potassa	Trace.
	100.000

No. II.—*Green-sand marl.*

Moisture	4.025
Lime	7.260
Carbonic acid	5.452
Iron and alumina	3.950
Phosphoric acid	0.250
Alkalies	0.700
Silica	78.363
Magnesia	Trace.
	100.000

A specimen of lime marl (*Calcareous tufa*) from Charles G. Thomas, San José, Santa Clara County, California, on analysis gives the following results:

Moisture	1.500
Carbonate of lime	58.360
Iron and alumina	7.495
Alkalies	0.250
Phosphoric acid	Trace.
Silica	32.910
	100.000

A specimen of gypsiferous marl from D. E. Coon, Selma, Alabama, is composed of—

Calcium sulphate, (gypsum)	22.355
Silica and alumina	60.205
Moisture	17.440
	100.000

A commercial fertilizer, under the name of "Clark's ammoniated bone," manufactured in Philadelphia, gives on analysis the following results:

Moisture, (determined at 100° C.)	6.2000
Organic matter	37.6500
Soluble phosphoric acid	8.6670
Insoluble phosphoric acid	8.0787
Lime	19.2696
Sulphuric acid	4.9648
Alkalies	0.5000
Silica and other insoluble substances	14.6699
	100.0000

Hon. W. Hunter, Second Assistant Secretary of State, sends to the Department of Agriculture a dispatch (No. 61) from the United States vice-consul at El Paso del Norte, Mexico, with the specimens of alkali described in the dispatch. We append an extract from the communication of Mr. Pierson, the vice-consul, which gives a clear idea of the location and extent of this singular deposit:

* * * There is a large basin, or quantity of low, flat, and damp land, containing about 5,000 acres, situated in the state of Chihuahua, one hundred and fifty miles distant and southward from this city, in parallel 31, near Lake Guzman, which produces these pearls; for the specimens clearly resemble the pearls made from the black

potash of the Northern States. This pearl pan or lake is known in this country as Alkali Lake. There appears to be an underground deposit of alkali which is constantly rising to the surface in a kind of gas or vapor which crystallizes on the surface of the ground in one continuous and complete crust over the whole pan, in a thickness ranging from ¼ to 1¼ inches. The Mexicans use it for the manufacture of bar-soap, which is far superior to any rosin or common bar-soap of the United States. When this crust is taken off the ground another complete crust forms in a week; and thus it appears that fifty-two crops or gatherings may be made during the year, and thousands of pounds can be obtained at one time. * * * A Mexican arrived in this city yesterday with a load of these pearls, containing 16 fanegas, (equal to 2½ English bushels per fanega,) and sold the same to Ernest Augustine, merchant, for the purpose of making soap, for the sum of $1.25 per fanega; and from which I gathered these specimens. If the Department will have them analyzed, I shall be pleased to know the true nature of these pearls.

The specimens were averaged and a sample submitted to analysis with the following results:

Moisture	3.8163
Potassium sulphate	1.3000
Sodium sulphate	11.4948
Sodium chloride	5.0967
Sodium carbonate	7.3915
Sodium bicarbonate	70.9002
	100.000

From the above it will be seen that this is substantially a group of sodium salts, consisting chiefly of bicarbonate. The potassa, after subtracting the sulphuric acid with which it is united, amounts to less than 1 per cent.

NOTES FROM FOREIGN JOURNALS.—*Soil temperature.*—M. Becquerel, in his experiments with the electric thermometer, has found that calcareous and siliceous soils absorb and retain more heat than argillaceous and humid soils, and that the temperature of the air above the former is diminished while it is rising to its highest point, but above the argillaceous soil it is increased. These conditions are reversed when the soils are diminishing in temperature.

The practical inference from this is that vegetables liable to be injured by frost should be planted on calcareous or siliceous soils, for the danger of frost-injury is during the hours when the soil is losing heat. If, however, it is desirable to raise such vegetables on moist clay soils, they should be protected from the cooling action of the earth.

Influence of vegetable mold on soils.—M. Schlœsing concludes, as the result of his investigations, that vegetable mold acts favorably on all qualities of soils. On loose sandy soils, vegetable mold has a tendency to consolidate the particles and render the soil more compact and consequently more retentive of moisture and the fertilizing gases. On the other hand, stiff, compact soils are rendered friable and mellow by a mixture with vegetable mold. The improvement in the mechanical condition of the soil may be regarded as chief effect of vegetable mold.

Utilization of sawdust.—M. Gustave Huezé says that, though sawdust decomposes very slowly, yet it may be economically used as litter in stables, and left for several months in contact with the solid and liquid excrement of animals, which it readily absorbs. It may also be composted with quick-lime and left in a heap for about a year. Additions may be made to this heap from time to time, but, when such additions are made, the whole heap should be well stirred. It will be improved by being frequently saturated with urine or sewer-water. Sawdust thus treated may be used on partially exhausted soils with great advantage.

Assimilation of crops.—M. Isidore Pierre has given to the public, in a tabulated form, the result of an extended series of experiments made for the purpose of determining the progress of assimilation during the growth of crops. The objective points of the experiments are thus stated:

First. At what stage in the life of the plant do fertilizers act most effectually in furnishing them the different parts of their substance and at what stage does this action practically cease?

Secondly. At what stage of its growth does a plant cease to take from the soil, either wholly or in part, the elements which enter into its composition, and when is it most exhausting to the soil?

The discussion is given at length in the June number of the Journal d'Agriculture Pratique, and contains much of interest. We can give only the tables exhibiting the results, from which our readers can make their own inferences. Tables Nos. 1 and 2 refer to crops of wheat, and the experiments were made in different years. No. 3 refers to a crop of colza, and is of value to the American farmer only as illustrating a general principle, as the crop is not raised in this country. The figures refer to kilograms, per hectare, but, as the reference is really to proportions, the reader may call them parts of any measurement he chooses.

TABLE No. 1.

	April 9.	May 16.	June 13.	June 29.	July 15.	July 30.
Organic matter, deducting nitrogen	838.0	2141.1	4962.5	6083.0	6520.9	6500.5
Nitrogen	35.8	57.8	72.6	73.2	68.7	67.8
Silica	25.2	67.2	153.7	192.0	203.8	206.6
Oxide of iron	1.3	9.3	14.2	20.5	14.8	15.8
Phosphoric acid	7.2	13.5	16.7	18.3	17.4	18.3
Lime	14.8	26.1	37.6	38.0	40.3	32.3
Magnesia	2.7	6.3	7.4	8.0	7.0	7.5
Potassa	16.3	22.6	37.2	42.7	33.2	32.7
Soda	3.9	4.2	8.2	9.7	9.5	5.2
Total	955.2	2348.1	5310.1	6485.4	6915.6	6897.7

TABLE No. 2.

	May 11.	June 3.	June 22.	July 6.	July 25.
Organic matter, deducting nitrogen	1230.3	2737.8	5309.1	5743.3	5731.6
Nitrogen	50.9	52.1	89.9	84.6	78.6
Silica	35.3	67.3	127.8	104.0	102.8
Oxide of iron	5.6	5.2	6.9	6.9	5.9
Phosphoric acid	9.8	11.9	18.7	17.7	16.2
Lime	17.5	21.7	31.3	28.6	23.8
Magnesia	3.5	3.7	7.5	6.7	7.5
Potassa	22.0	23.4	27.0	27.9	23.5
Soda	13.8	21.0	24.5	26.6	14.8
Total	1397.7	2994.1	5642.7	6040.3	6010.7

TABLE No. 3.

	March 23.	April 2.	May 6.	June 6.	July 20.
Entire crop	2896.0	3393.0	7172.0	8085.0	8005.0
Mineral matter, (ashes)	333.7	393.3	853.9	806.9	578.1
Nitrogen	77.6	82.4	121.7	116.7	111.1
Phosphoric acid	30.8	37.0	73.0	73.6	78.1
Lime	95.6	112.2	259.9	255.0	175.9
Magnesia and alkaline salts	139.3	152.3	159.9	213.3	209.6

It will be seen from the above tables that, at the period of blooming, plants have reached their maximum in the appropriation of nitrogen, iron, phosphoric acid, potassa, magnesia, and soda, and that silica is increased during the period of ripening, and lime also (as shown in the first table) appears to increase until within fifteen days of maturity. This is what might be expected, for at that period the straw is becoming more solid by the thickening of its enamel, which is composed chiefly of silicate of lime.

Another curious fact, which these experiments teach, is that not only does the plant cease to appropriate mineral elements (except silica) in the last thirty days of its growth, but that it actually returns to the soil, as unnecessary for its purposes, a considerable portion of that which has already been absorbed. A crop removed at the period of flowering will take more from the soil than it would if permitted to ripen fully before cutting.

SCIENTIFIC NOTES.—*Increased consumption of sugar.*—Though the manufacture of sugar was commenced in the West Indies early in the sixteenth century, yet its use in domestic economy did not become general in Europe or America before the beginning of the last century. In the year 1700, only 10,000 tons were used in Great Britain, though the English were at that time the leading manufacturers of sugar. The consumption of sugar in the British Islands in the year 1870 is stated at 600,000 tons. In this country the consumption of sugar is steadily increasing. Since the close of the late war, the ratio of increase has been about 10 per cent. annually, and in the year 1871 the sugar consumed in the United States amounted to 700,000 tons, an increase of 15 per cent. on the preceding year. This is the largest consumption of sugar, in proportion to the population, found in any nation on the globe. A very small proportion of the sugar consumed in the United States is produced within our own territory, while in Europe the production of sugar is rapidly increasing and bids fair soon to render the principal nations of that quarter independent of the tropical regions in regard to the supply of sugar. Since the year 1850, the production of sugar from beets in France has risen from 60,000 tons to 300,000; in Austria, from 10,000 to 80,000 tons; and Russia, where beet-culture was introduced since 1850, now produces 100,000 tons of sugar. The increased consumption of sugar may be taken as the evidence of an advance toward a higher civilization.

Respiration of fishes.—N. Grehaut (Comptes-rendus, lxxvi, 621) reports a series of experiments on the breathing of fishes, important, as being in the line of those of Humboldt on the same subject, and reaching results, in some respects, at variance with his. Grehaut reports that fishes give off a volume of carbonic acid (anhydride) equal to the volume of oxygen exhaled. Humbolt states it at only four-fifths of this. Again, Grehaut affirms that nitrogen is increased in the air exhaled, while Humboldt reports it as diminished. We are not told, however, that the experiments were made on the same kind of fishes and under similar circumstances.

These experiments prove that fishes can remove the whole of the oxygen dissolved in water and can even deprive arterial blood of its oxygen when the same is mixed with the water which the fish inhales. The writer regards this fact as of importance in general physiology, as illustrating the mode in which oxygenation of the blood is effected in the mammalian fetus, through the maternal placenta.

Bismuth.—Reports reach us of the discovery of a very promising mine of this metal in Utah, at a place called Beaver, about two hundred miles south of Salt Lake City. If these reports prove true, the discovery may be regarded as one of great importance to the arts. Bismuth has heretofore been ranked among the rare metals, and its use has been limited on this account. A single mine at Schneeburg, in Saxony, furnishes the greater part of the bismuth used in the arts, and this mine is said to be nearly exhausted. Bismuth, in limited quantities, is found in a few other localities in the Erzgebirge range of mountains; it also occurs, associated with other metals, at Cornwall and Cumberland, England; at Monroe, Connecticut, and at Brewer's mine, in Chesterfield District, South Carolina. If the Utah mine shall prove as rich as present reports indicate, bismuth will be introduced into many processes in the arts where cheaper substitutes have been used heretofore. Bismuth is a hard, brittle metal, of a reddish-white color. It fuses at 507° F., and on cooling expands more than any other metal. An alloy of two parts of bismuth, one of lead and one of tin melts at the boiling-point of water. In the mines of Saxony it is found in the form of native metal.

Milk.—Professor Law, of Cornell University, publishes in the Lens some interesting observations on living organisms in milk. Two specimens were placed under the microscope after twelve hours' exposure. The appearance exhibited is described as "an abnormal adhesiveness of the oil globules, which had accumulated in dense masses instead of remaining apart, as in healthy milk. Intermixed with the globules were dark-colored spherical bodies of a much larger size, spores, and filaments. On examination of the water drunk by the cows, it was found to contain numerous spores of low forms of vegetable life. The cows yielding the morbid milk appeared in health so far as appetite, rumination, pulse, breathing, and state of skin were concerned, but the temperature was higher than usual, and, on microscopial examination of the blood, it was found to contain certain ovoid bodies of at least double the size of the ordinary blood-globules. Upon withholding the water, the impurity of the milk at once disappeared. The chain of evidence now appeared complete. The water contained vegetable spores which developed into a luxuriant growth of mycelium when the milk was allowed to stand." The plain inference from all this is the great importance of furnishing cattle pure water to drink, if we expect healthy milk from them.

Eucalyptus globulus.—This Australian plant, or rather tree, known by the common name of Blue Gum, has been introduced into some of the Southern States and appears to be well adapted to the climate. The whole plant—leaves, bark, wood, and root—is pervaded by a peculiar aromatic, bitter principle, and a pungent volatile oil has been distilled from the leaves. To this oil the name of "eucalyptol" has been given. The leaves and bark of this tree have attained a high reputation among the natives of Australia for the cure of malarious diseases. Lately we observe that Doctor Coleman, resident physician at the United States marine hospital at San Francisco, California, has used it in the treatment of fevers with marked success. He administered it in the form of a fluid extract, prepared by his directions. Coming from this source, the statement may be regarded as altogether reliable. Dr. Coleman treated five cases of remittant fever, nineteen of chills and fever, and nine of typhoid fever with the fluid extract of eucalyptus and reports satisfactory results in every case. He treated a number of other diseases with this remedy, where it appeared to be indicated, and the result was various, curing many cases and improving most. The active principle is said to

possess great power in preventing confervoid growths in fluids. In this it much resembles quinine, for which it is proposed as a substitute.

Printing on cloth.—M. Vail (Comptes-rendus, June 10, 1872) proposes a new method of printing on cloth. It is known that when a solution of nitrate of silver is brought into contact with copper or zinc, silver in the metallic form is precipitated in a very fine state of division. If the cloth to be printed be moistened with a weak solution of nitrate of silver and impressed with clean-faced types of copper or zinc, and the fabric immediately washed in soft water, a clear and sharply defined impression will remain and will resist the action of acids, alkalies, or soaps. The color of the impression may be varied, according to the strength of the solution, from a light gray to a deep black.

Aluminium coins.—French authorities state that the government, on the recommendation of a scientific commission, has ordered experiments to be made on the propriety and practicability of substituting an alloy of aluminium for the bronze now used in coins. Aluminium has many properties which adapt it well to the purpose of coinage, and some of its alloys are very beautiful.

Cooking-utensils made of copper are lighter and more convenient than those made of iron, but the poisonous character of all the compounds of copper, liable to be formed in the use of such vessels, is a serious objection to them. Copper vessels may be rendered perfectly safe by coating them in the following manner: Take twelve parts of fluor spar and as much unburnt gypsum, and add one part of powdered borax. Fuse this mixture in a crucible. Pour the fused mass out, and after it has cooled grind it fine with water, so as to form a thin paste, with which the inside of the copper vessel is to be painted. After this the vessel is set away in a warm place till the paint is dry. When it is thoroughly dry, the vessels are baked in an oven till the coating is fused. On cooling, the vessel will be found coated with a smooth, white, opaque enamel, which adheres strongly to the copper and protects it from the action of all the vegetable acids.

Nitrate of ammonia in respiration.—M. Struve, by a series of well-conducted experiments, has detected nitrate of ammonia in the water exhaled from healthy lungs in breathing. From this he concludes that the nitrogen of the air we breathe is not entirely passive in the process of respiration, as physiologists have heretofore supposed.

Production of ozone in the air.—A series of very interesting experiments have been made at Kissingen which prove conclusively that ozone is formed during the evaporation of water. Great care was taken in these experiments to avoid such tests as might mislead the experimenter regarding the true character of the active principle formed. Led by the light of these experiments, we must infer that the air on the ocean is richer in ozone than the air of inland places. Observations made on the island of Texel confirm this view.

Paper lamp-shades.—Dr. Mirus *(Polytechnisches Notizblatt)* mentions two cases in Jena and one in Frankfort where persons using green glazed paper lamp-shades were poisoned by the arsenic of the coloring matter. The heat of the lamp volatilized the arsenic, and rendered the small quantity present very dangerous. In rooms properly ventilated green lamp-shades may be harmless, but in close rooms such shades should be avoided.

Non-inflammable fabrics.—Cotton or linen goods may be rendered

non-inflammable by being dipped in a solution of equal parts of acetate of lime and chloride of calcium dissolved in twice their weight of water.

Chromium steel.—A patent was obtained some time since, by Mr. Bauer, for the production of steel, in which a part, or the whole, of the carbon of common steel is replaced by metallic chromium. It is claimed for this variety of steel that it is capable of sustaining, without injury, a higher heat than ordinary steel, and is less liable to become oxidized or "burnt" in working. It is said to work quite as easily, and to give a much smoother surface when rolled than common steel. From the report of Captain Eads, chief engineer of the Saint Louis bridge, we learn that this steel has been employed in those parts of the bridge where great strength is required, and that it has given entire satisfaction, even where bolts of the best cast steel had failed.

Progress of chemistry.—One by one the organic products are being copied in the laboratory. The last triumph in this direction which has come to our notice is the production of glycerine by Friedel and Silva. If the vapor of fusel oil be passed through a red-hot tube, propylen is formed, which readily combines with chlorine, and from this chloride of propylen glycerine is produced by a process in which no glycerine is employed. As glycerine is the base of all true fats, this is an important step in the direction of oil making.

Chloralum.—Professor Fleck reports to the government of Saxony a series of experiments with a disinfectant bearing the above title, manufactured by the "Chloralum Company" in London. It is sold in the fluid form put up in neatly-labeled vessels, each containing 637 grams, (17.82 fluid ounces,) costing 15 groschens, (37½ cents;) or in the form of a white powder put up in tin boxes, each containing 370 grams, (7.39 ounces,) at 5 groschens (12½ cents) per box.

Dr. Fleck ascertained that the fluid consisted of—

Water	82.32
Chloride of lead	0.15
Cloride of copper	0.10
Chloride of aluminum	13.90
Chloride of iron	0.42
Chloride of lime	3.11
Total	100.00

The powder had substantially the same composition with the addition of 32.15 of uncombined clay and sand. The process of manufacture is reported at follows: "A calcareous clay containing but little iron is dissolved, as far as possible, in fuming hydrochloric acid. The clear concentrated liquid above the undissolved clay is drawn off in bottles, and sold as 'Chloralum.' The residue, with the liquid adhering, is evaporated to dryness in leaden pans, and put up in boxes to be sold as 'chloralum powder.'" Its powers as a disinfectant were carefully examined by Dr. Fleck, and reported in the following language:

In order to test the importance of chloralum as a disinfectant, equal volumes of sewage were treated with chloralum, chloride of lime, alum, sulphate of iron, quicklime, and chloride of magnesium, and the impurities remaining in the clarified solution determined with the alkaline silver preparation. The result is given in a tabular form, the effect of chloride of lime being assumed as the standard.

Chloride of lime	100.00
Caustic lime	84.00
Alum, (sulphate of alumina and potassa)	80.40
Sulphate of iron	70.70
Chloralum	74.00
Chloride of magnesium	57.00

Chloralum may be cheaply produced by the action of hydrochloric acid on clay, but it is inferior in disinfecting power to several other chlorides and sulphates which may be produced very cheaply. Chloralum is no way related to the newly-introduced drug chloral hydrate. It very properly derives its name from its chief ingredient—chloride of aluminum—chlor-alum.

Wastes of cities.—How to remove the constantly accumulating filth of cities, and thus relieve them from a fruitful source of disease, and how to utilize this waste so as to restore to the agricultural interest the fertilizing elements of which it is perpetually robbed, are questions of the first magnitude, and questions which are earnestly pressing on this age and demanding an early solution. Modern cities have generally followed the example of Rome in disposing of their garbage and excretæ through a system of subterranean sewers. This system makes no pretension toward economising these wastes, and the efforts which have recently been made in this direction, whether by using the sewage for irrigation or by precipitating its solid matter, have practically been but little better than failures. In a sanitary point of view, the whole system of disposing of offal by sewers is sadly defective. The offensive matter is put out of sight, it is true, but the gases arising from it pervade the whole atmosphere of the sewer, and most of these being lighter than air escape at every man-hole or other opening along the line of the sewer; and if these be secured, still, in the warm, dry months of summer, the bricks, of which the sewers are usually constructed, and the earth above them become easily permeable to gases and allow these to escape readily.

During the prevalence of contagious diseases in cities, if the excretæ of patients be thrown into the sewers, these become a most effectual means of propagating and perpetuating disease. Sewers, as a means of carrying off accumulations of surface-water and the wastes from hydrants are indispensable; but the health of cities and the interests of agriculture alike demand that the perishable wastes of cities be disposed of in some manner less objectionable. This demand, however, has not been successfully met up to the present time, but if we may judge from the energetic efforts being made in this direction, the prospects of a favorable solution of the problem are altogether hopeful.

This Department is in receipt of a communication from James Alexander Manning, of London, England, in which he gives the general outlines of his method of disposing of the wastes of cities, which he assures us is in successful operation at the English capital. If the report of his operations is reliable, (and we have no reason to doubt his statements,) the improvement is of incalculable importance, both in its sanitary and agricultural aspects. The system of sewers prevailing in most of our American cities is not well adapted to the introduction of Mr. Manning's method, and would, probably, prove a formidable obstacle to its general adoption.

We present a description of Mr. Manning's process in his own language:

I will now, as briefly as possible, explain the nature of my process, by which it will be perceived that no portion of the fertilizing elements of night-soil can be lost in the collection or manufacture of the manure, or in any of the operations to which they are subjected, as the excretæ are completely deodorized and disinfected in the cesspits or other receptacles devoted to that service; are removed in hermetically-closed carts, are discharged into hermetically-closed evaporating chambers and evaporated to dryness, the deleterious gases, the soot and gaseous products of the coal employed in the manufacture, together with the vapors from the liquid portion of the fecal matter, being all drawn off from the evaporating-chamber by means of a powerful exhaust

and discharge fan, which is made to rotate with great velocity by means of a powerful steam-engine.

The mode of collecting the deodorized and disinfected contents of the cess-pits or other receptacles of fecal matter must depend in some measure on circumstances, the barometric system being preferred, by which, in half an hour, the work of the greater part of a night under the old bucket system, is effected without noise, dirt, or bad odor of any nature, and, under proper regulations, without the slightest disturbance to the inhabitants. When the iron cylinder, or barrel-cart, with the pump and hose, cannot be conveniently employed, equally effective measures will be adopted to prevent the possibility of nuisance. As soon as a cess-pit is emptied, such chemicals are introduced into the empty pit as will effectually prevent the fermentation of the urine, which generally commences within a few hours after its deposition, and will entirely fix the ammonia, and retain it until the pit will require to be re-emptied. The fermentation of the urine converts all the different forms of the ammonia contained in the solid and fluid excretæ into carbonate of ammonia, which, being of the most volatile nature, has hitherto escaped so rapidly from the pits into the air, to the great detriment of the public health and loss to agriculture, that in less than one year it has been found that at least 50 per cent. of that valuable salt has been liberated; but under the operation of my process the whole of the ammonia will be preserved for the benefit of agriculture. The carts are then drawn to the works, which should be erected at such a distance from the town as not to offend the most delicate susceptibilities, though, in fact, nuisance of any nature is rendered absolutely impossible, every operation, from the collection of the raw material to the packing of the manure in bags for the market, being conducted in hermetically-closed vessels. The excretæ are then discharged into large fire-brick evaporating-chambers, from 30 to 60 feet in length, or longer, if necessary; 6 feet wide and 5 feet 10 inches high. * * * The evaporation of the excretæ to dryness is effected by means of one or more furnaces or fires, so arranged that the heat shall pass under, up the sides, and inside, under the arched roof of the chambers, and over the surface of the liquid to be evaporated, all the soot and gaseous products of the coal employed in the manufacture of the manure being drawn over the surface with great rapidity, in combination with the vapors from the fluid portion of the excretæ, by means of a powerful exhaust and discharge fan, as before stated, which is made to rotate with great velocity by means of a steam engine, so as to supersede the necessity of a chimney-shaft, and keep all the gases and vapors under perfect control, and prevent them from coming in contact with the atmosphere. The vapors and gases are then conducted or discharged with considerable force into a large iron receiving-tank, surrounded by water for the condensation of the vapors, when the carbureted hydrogen gas and the atmospheric air pass off by an ascension-pipe on the top of the receiver into a gasometer, or otherwise, for further treatment, as may be deemed necessary, the ammoniacal gases from the coal consumed in all the operations of the factory, being conducted into the same receiving-tank, are retained therein, and form with the water of condensation a weak solution of ammonia, commonly called ammoniacal liquor, which is subsequently drawn off into a large cast-iron still, and converted, in the ordinary manner, into sulphate of ammonia, which is added to the manure to increase the percentage of that salt therein, or may be sold separately as an article of commerce.

Having thus shown that all the operations of the factory are conducted in hermetically closed vessels, and that nuisance from the emanation of bad odors or mephitic gases of any kind is rendered impossible, I will only further observe on this part of the subject, that all the details of construction, furnaces, dampers, flues, steam-pipes, &c., being accurately set forth in the drawings and the diagrams submitted for examination, it is unnecessary here to enter into any minute description of their details, as it will suffice to state that ample provision is made for all possible contingencies, such as the continuous agitation of the excretæ by steam power during the rapid evaporation of its liquid portion—the introduction of a jet of steam, through the hollow shaft of the agitator—into the evaporating chamber at the commencement and again toward the conclusion of the operation, to prevent injury to the agitator, &c., until the vapors arise, as well as shutting off the fire by means of dampers from under the invert of the chamber at a certain point of the operation, and passing it entirely over the surface of the nearly dry sediment, but under the crown of the arched roof, to prevent the charring thereof, and the consequent deterioration of the manure. The dry sediment or manure is then removed by long scrapers, or other suitable means, into the cooling chamber, which is constructed with a cupola roof, the top of which is furnished with a small exhaust-fan for carrying off the heated air, the cooling being further expedited by the admixture, in suitable proportions with the hot dry sediment, of the cold ash products or charcoal obtained either by the simple incineration or by the conversion in closed ovens or kilns of the waste animal and vegetable substances of the district or locality in which the process may be established, so that, whatever may be the nature of the wastes, they may be utilized for agriculture and the improved sanitary condition of the locality.

By these means manures are produced containing all the organic and inorganic constituents indispensable to the structure and development of plants, with such a percentage of ammonia as would enable it to compete with guano even if that valuable manure were not, as it unfortunately is, now nearly exhausted. I may observe that in the instance of some waste substances of vegetable origin, purchasable at a small cost for conversion into manure, and which are known to contain a considerable percentage of ammonia, phosphoric acid, &c., instead of incineration, or conversion into charcoal, they will be dissolved by sulphuric acid, in order to retain the ammonia; and to increase the percentage of soluble phosphate—the phosphates contained in fecal matters not being considered sufficient for the cultivation of turnips or root crops in general by the scientific farmers of the age—a sufficient quantity of bone-dust will be mixed with the excretæ in the evaporating-chamber at each operation, which, by the action of the acid and other chemical substances applied thereto for the retention of the ammonia, will convert the bone-dust during the operation into soluble phosphate of lime, without any other treatment.

BOTANICAL NOTES.

By George Vasey, Botanist.

Forest-tree culture.—Unquestionably one of the most important questions engaging the attention of the American people is that of forest culture. The demands of our rapidly growing country have for many years so drawn upon the resources of our native forests, which at one time seemed inexhaustible, that we must now contemplate their early extirpation, and address ourselves to the task of conserving what forests we have remaining and providing new sources of supply.

Much has been written on this subject, but so difficult is it for us to realize the bearing of remote evils that comparatively very few farmers or land-owners have yet seriously engaged in the work of replenishing their woodlands. The arguments for this work are strong and numerous, and have been cogently presented by many writers. Many facts have been observed which appear to show that the presence of forests has much to do with the climate and rain-fall of a country; thus, it is said that the extreme dryness of Spain is due to the absence of trees; that many districts in France have been materially injured by denudation; that Palestine and many other parts of Asia and northern Africa, which in ancient times were the granaries of the world, are now deserts or infertile regions, in consequence of the loss of their forests. It is also stated that a beneficial change in climate and rain-fall has in several instances followed the introduction of trees and plantations in regions that were formerly destitute of them. Thus it is said that in Lower Egypt, where anciently rain never fell, the introduction and cultivation of extensive plantations have been attended with the fall of a good deal of rain, so that showers are no rarity even at Cairo. It is also affirmed that, in New England and other wooded sections, the clearing up of forests and cultivation of the soil have had the effect of causing the drying up of many springs and small streams.

There are some who doubt the correctness of these conclusions with respect to the climatic influences of forests, but, as these influences must be of very gradual operation and require observations over a long series of years, the question may be considered open for future inquiry.

But leaving that question out of view there remain abundant reasons to stimulate every land-holder in our vast prairie-regions to give practical attention to the subject.

Trees are wanted for their fruits, for their shade and protection from

winds, for ornament, for fuel, for use in building, fencing, and the mechanical arts. Some trees are adapted to one of these purposes and some to another.

The earliest tree-want which is appreciated by farmers in a new country is the want of fruit-trees. Even this practical and personal need too often fails to stimulate the farmer to immediate action toward the formation of an orchard. But it is not with reference to the cultivation of fruit-trees that we now design to write.

What kinds of forest-trees shall we attempt to cultivate? is a question often asked, toward the solution of which we propose to offer a few thoughts. In an open prairie-region there is an immediate and urgent want of trees for shelter and wind-breaks. Both man and the domestic animals instinctively seek the grateful shade of trees during the intense heat of summer, and as instinctively seek their shelter from the fierce winds of winter. The intelligent farmer also knows that it is a question of positive economy, as the absence of suitable shelter must be represented by an increased consumption of food and fuel. Often, too, he finds that without some suitable wind-breaks he is unable successfully to cultivate the best varieties of fruit-trees. He wishes to secure these advantages of shade and shelter at the earliest possible period, and hence he inquires for rapidly growing trees for cultivation. The great cost of fencing on the prairie leads him to seek some suitable tree or shrub for the growth of hedges. It is true that many experiments in this direction have been attended with failure, but we should not be deterred from continuing our experiments until a suitable hedge-plant is found for every section of country. If the Osage orange fails, let us try the honey-locust, or some of our native thorn-bushes, crab-apples, wild plums, viburnums, or other shrubs or trees, until we meet with success.

The production of wood for fuel and for mechanical uses is an object which, however desirable, has seemed so remote in prospect that it has been almost universally neglected. But even this neglect is to a great extent based upon too general and vague views as to the slowness of tree-growth.

There are several species of trees which with proper cultivation will acquire a circumference at the trunk of eight to ten inches in five years' growth, and a few acres of such trees would soon furnish a constant supply of desirable fuel to farmers who now have to haul, at great expense of time and labor, a distance of from five to ten miles. Most of the rapidly growing trees produce soft wood which is not much esteemed for fuel, but for summer use, when properly prepared, it must be equal, if not superior, to the corn-cobs which are extensively used for fuel in the Western States. Many western farmers have cultivated their prairie-lands for twenty years and have hauled their fuel from a distance, when during that time cottonwood trees of 2 feet diameter, white maple of 18 inches, box-elder of 20 inches, and butternut of 18 inches, might have grown upon their own lands with a little labor and care.

The planting and cultivation of hard-wood trees suitable for building purposes and use in the mechanical arts is one which has been almost wholly neglected in this country. It is a work which is too commonly regarded as being wholly for the benefit of posterity, and we are slow to realize that we have any duties in that direction. But the necessity of entering upon this work is apparent, for it is not difficult to contemplate the period when our natural forests shall have disappeared under the enormous demands which the progress of our country makes upon

them. Some of the trees which at the present time seem most deserving of trial for the purposes we have named we will briefly notice.

Cottonwood.—In the Western States and Territories the name "cottonwood" is applied to the *Populus monilifera.* Groves of this tree are common on the streams which traverse the great plains. Near the base of the Rocky Mountains, however, as in the Platte bottoms near Denver, two other species of poplar are associated with it in the cottonwood groves, viz, the narrow-leaved cottonwood (*Populus angustifolia*) and the balsam poplar (*Populus balsamifera*). They are all large trees, of rapid and vigorous growth, and are readily propagated from cuttings. They are particularly recommended for wind-breaks and shelter for more tender and slow-growing trees. A belt of cottonwoods around a young orchard will undoubtedly save many trees from loss by frosts, and contribute to their thrift and productiveness. All the poplars are dicœcious and objectionable for planting in the immediate vicinity of dwellings on account of the abundant cottony down of the seeds, which fills the air after their maturity. This inconvenience can be avoided, however, by propagating from cuttings of the male tree only.

The maples.—For ornamental culture, for usefulness of wood, and for vigor of growth, there are few trees so worthy of attention as the silver-leaved, or white, and the red, or swamp maple. In the Western States the red maple is comparatively rare. The white helps to diversify the forest growth on the bottom-lands of most of the western rivers, and is largely planted as a shade-tree in the cities. Perhaps the most serious objection to its cultivation is that its long, slim branches are liable to be broken by storms of sleet and snow. This difficulty could probably be obviated by a judicious yearly shortening in of the branches. In some parts of the West it has suffered severely from the ravages of a borer, which penetrates the trunk.

The red maple is more compact and somewhat less rapid in its growth, but is deserving of large planting.

Hard maple.—For beauty of form, for its close and compact foliage, for the value of its wood and of its saccharine juice, no cultivator should neglect the sugar-maple. In the whole family of maples, whether native or foreign, this species is without a peer. It is a little shy of transplanting, and for the first few years is of slow growth, but when it is established it is worth many times it cost. Several foreign species of maple are cultivated for ornament and shade in the eastern cities, but they present no advantages over our native ones.

Box-elder, (Negundo aceroides.)—This tree rivals the cottonwood in rapidity of growth, and is deserving of particular attention, combining not only the qualities of rapid growth, of hardiness, of handsome foliage, and a good quality of wood, but having also great promise as a sugar-producing tree. The sugar made from it is not equal in flavor to that from the hard maple, but is yet of an excellent quality. A committee of the Illinois Horticultural Society examined this tree with reference to its value for sugar and reported: 1st. That it produces more sap than the sugar-maple of equal size, half a gallon per day being obtained from a small tree of 3½ inches in diameter and five years old. 2d. That the sap is richer in sugar, the yield of dry sugar averaging two and eighth-tenths per cent. of the weight of the sap. 3d. The sugar produced is in general whiter than that from sugar-maple treated in the same way. These facts should recommend this tree to the early attention of all tree-planters, especially in prairie-regions.

Ailantus.—The ailantus appears to be one of the most promising trees for cultivation in the West. It thrives well even on hard and stony soils. It is a native of China, but has for many years been cultivated in Europe and in this country. It approaches in botanical affinities nearer to the wafer-ash, or hop-tree, than to any other tree of this country. It produces flowers of two kinds, generally on different trees. The male flowers are produced in large panicles, and are of a greenish-yellow color and very disagreeable odor, which circumstance has made it quite unpopular as a shade-tree in cities. This, however, would not be a serious objection to its cultivation as a forest-tree. The wood is hard and fine grained, and well adapted to cabinet-work. It is also good for fuel. In France and Southern Europe it grows to a large size on chalky soils, where few other trees will live. It has been largely planted on the plains of Southern Russia to fix the loose, blowing sands. North of latitude 40° it will probably be too tender for profitable cultivation. It is easily propagated, either from seeds, suckers, or root-cuttings. It was introduced into this country under the name of "Tree of Heaven," and is indeed a beautiful tree when in full foliage.

Ash.—We have five or six native species of ash, all of which are ornamental and useful trees, but two species, the white and the blue, are especially valuable and should be among the kinds planted by every cultivator. The timber of the ash is adapted to a great variety of uses, particularly in the manufacture of farming-tools. On account of the great demand for this timber for agricultural implements, for carriages, and furniture, it is becoming scarce, and its cultivation promises to be very remunerative at an early day. The white ash becomes one of our largest forest-trees, attaining the height of 70 or 80 feet with sometimes a diameter of 3 feet at the base. The wood is white and remarkable for its toughness and elasticity. For these qualities it is used for hoops, pitchfork and rake handles, and for wagon-shafts. Emerson relates that an ash tree in Granville, Massachusetts, was rived into 3,000 rake-handles. It was 4½ feet in diameter and had a shaft of 70 feet without a limb. The white ash requires a deep, moist soil for its greatest perfection. Most prairie soils are well adapted to its growth. It bears transplanting well, and is remarkably exempt from the attacks of insects. The blue ash occurs in the bottom lands of the Western States. It may be readily distinguished by the young shoots being square or sharply four-sided. The wood is said to be more durable even than that of the white ash, especially when exposed to the weather, as for fence-posts, stakes, and rails. This species has a southern and the white ash a northern range, and probably the blue ash will be best adapted to cultivation south of 40° and the white ash north of that latitude. The seed of either may be sown in the fall, thinly covered with earth, and lightly mulched with straw, or it may be sown in the spring, after being mixed with moist sand and exposed for a few days to a warm sun.

The walnuts.—The black walnut is a timber of so much importance in cabinet-work, and is becoming so scarce by the constantly increasing demand, that no tree-cultivator should neglect to give it a place in his plantation. The tree begins to bear fruit at an early age, and the nuts, which much resemble those of the English walnut, are much esteemed by most persons.

The white walnut, or butternut, furnishes a wood of similar texture, light brown, fine-grained, and easily worked, but not so ornamental. The walnuts do not transplant well, and therefore the nuts should be planted where the trees are to remain. From the seed they grow vig-

orously, especially the white walnut, which almost equals the soft maple in thrift.

The elms.—Of our elms, the white and the red are the most important. For an ornamental tree for parks, lawns, and streets, they have a national reputation. They are hardy, grow with tolerable rapidity, and are readily transplanted at almost any age. The wood of the white elm is rather inferior in quality; that of the red is stronger and more durable, and is much used for the manufacture of wagon-hubs, carriage-wheels, &c.

The white willow.—Notwithstanding the prejudice which exists against this tree, on account of the extravagant representations made of it a few years ago as a hedge-plant, it attracts attention, from its rapid growth, as well adapted for wind breaks and screens. It may be planted in low grounds which are unsuited for most trees, and will thrive best in such situations. Its light and graceful foliage affords an excellent contrast with most other deciduous trees, and in places where fuel is scarce it is deserving of cultivation for an early and abundant production of wood.

Evergreens.—By evergreens is commonly understood the family of coniferous trees, because, in northern latitudes, these are the only trees which retain their foliage throughout the year. The deciduous trees give us shade and shelter during the summer, but in our prairie-regions, during the coldest half of the year, these trees are leafless and afford only partial protection from the fierce blasts of winter. This consideration alone should recommend the cultivation of evergreens to every dweller upon prairie-soil, for not only is the personal comfort of man and beast concerned, but also practical economy, as it is well understood by intelligent farmers that the abstraction of animal heat by cold winds must be counterbalanced by an increased supply of food. But the fact that these coniferous trees furnish our most valuable building-material, that our native supply of them is rapidly disappearing, and the market value advancing affords strong and urgent argument for the attention of tree-growers.

Pines.—The white, Austrian, and Scotch pines are considered the best for general cultivation. Mr. Bryant says of the white pine, "No one of our native forest trees is more generally useful and no one better merits careful preservation and extensive culture. As an ornamental tree, it is surpassed by few, if any, of the genus. Its foliage is soft, its hue agreeable, and the whole appearance of the tree graceful."

The Scotch pine is one of the most rapidly growing species, and succeeds in very variable soils, being perfectly hardy, even in the most northern parts of our country. It bears transplanting with more facility, perhaps, than any other species. Its thick, dense foliage adapts it well for screens or belts for the protection of orchards. On account of its rapid growth, its valuable wood, its hardiness, and its adaptability to different soils, it is strongly recommended for cultivation. The Austrian pine has much resemblance to the Scotch, having longer and rigid leaves of a darker color. It grows vigorously, and from its stiffness and strength resists the most violent winds and does not suffer under the heavy accumulations of sleet and ice, which sometimes greatly injure more slender species. It has been extensively planted for ornamentation, and although rigid and ungraceful in habit, its dense and dark foliage in winter renders it very pleasant to look upon.

Spruce or fir.—The white and black spruce, the Norway spruce, and the hemlock, or hemlock-spruce, are the most important species of this

genus, (*Abies.*) The Norway spruce in particular has been highly recommended by several western horticultural societies as the most suitable tree for belts for the protection of orchards. It is perfectly hardy, bears transplanting, is vigorous in growth, and adapted to all common soils.

The white and the black spruces are among the most valuable ornamental evergreens, and their presence in the vicinity of the farm-house or dwelling is at once an evidence of taste, and adds materially, not only to the market value of a place, but presents agreeable objects for the eye, and relieves the dreariness of the winter landscape.

Among ornamental evergreens perhaps none is more deserving of a place than the hemlock. Its delicate light-green and silvery foliage and slender, drooping, graceful branches form a pleasing contrast with the stiffer and more rigid pines and spruces. Perhaps on account of its commonness in the Northern and Eastern States, it has been neglected as an ornamental tree. Mr. Meehan says of it that "it would be no exaggeration to pronounce it the most beautiful evergreen in cultivation." It has been recommended as a screen, or ornamental hedge, but for this purpose there is probably no evergreen equal to the arbor vitæ. This bears close planting, may be pruned into any desired shape, and forms a dense, compact wall of the deepest green. The Siberian and Chinese arbor vitas are considerably cultivated, and may perhaps suit some localities better than the American.

The larch.—The larch, although not an evergreen, is a coniferous tree, possessing the same general characters of structure and fructification as those we have mentioned. The American and the European are the two species which are known in cultivation. The European larch has of late years been very highly, perhaps extravagantly, recommended for general cultivation as a timber-tree on the western prairies. It has, indeed, many valuable qualities, being a very rapid grower, possessing a pleasing symmetry of form, and furnishing a wood of great value and adapted to a great variety of uses. Extensive plantations of it have been formed in Scotland, which have proved highly successful. The plantations of the Duke of Athol, in that country, are everywhere famous, and have stimulated to extensive planting of this tree in other countries. It has been tried in this country sufficiently to prove its value as a rapid, vigorous grower, hardy and beautiful, but the wood grown here has not yet been sufficiently tested to fully decide on its merits. Recently, indeed, Professor Matthews, of the Iowa Agricultural College, has thrown out some doubts about the durability of the wood grown upon the western prairies. It seems highly probable that the quality of the timber is affected more or less by soil and climate. Louden says that, "A certain elevation of surface, coolness of climate, and inferiority of soil, are absolutely necessary to produce the timber in perfection." On broken hills, bluffs, and slopes, it can probably be grown with great profit. The American larch very closely resembles the European, having smaller cones and shorter and paler leaves. Its natural situation is in cold swamps in the northern portions of the United States, where it is known as tamarack or hackmatack, but it seems to succeed well in cultivation on high and dry soils. Many contradictory statements have been made as to the value of the timber, some considering it even superior to the European species, others accounting it of little value. Mr. Lapham, of Wisconsin, says: "Those who desire to make plantations of the larch should take into consideration the character of the land to be planted; if it be wet, then the American larch should be chosen. It is a tall, slender grower, with coarse-grained, du-

rable, and valuable wood, wherever light, straight timber, such as hoop-poles, is required."

The variety of our native forest-trees is very great, and undoubtedly there are many other kinds which are equally entitled to cultivation, with those we have named. Forest-culture is yet in its infancy here, and we should go on experimenting and observing until we learn what are the most profitable and useful kinds.

YELLOWS OF THE PEACH.

By Thomas Taylor, Microscopist.

On the 1st of July last I commenced a series of experiments by the moist process with the bark of a peach-tree affected with the yellows. Into five-glass receivers I placed, respectively, a few drops of water, just sufficient to form a moist atmosphere in each. Into No. 1 I put a piece of bark affected with the yellows; into No. 2 a piece of bark from a healthy peach-tree; into No. 3 a handful of peach-leaves from the unhealthy tree; into No. 4 a similar quantity from the healthy tree; and into No. 5 portions of bark from the healthy and unhealthy trees mentioned. All the specimens were secured from the outward atmosphere. The temperature of the room in which the specimens were kept was frequently at 90° Fahrenheit. These conditions were highly favorable to the development of such fungi-germs as mature under excess of heat and moisture. Previous to arranging the specimens in the receivers they were examined minutely with a low power, but no signs of fungi were visible. On the 15th day the unhealthy specimens in Nos. 1 and 5 exhibited on their external surface a spotted appearance. When viewed by a power of 75 diameters they were seen to consist mostly of a translucent, yellowish-brown, spiral, thread-like fungus known as *Næmaspora.*

Plate 15.

Plate 15, figures 1, 2, 3, and 4, represents the first stages of this fungus. When a portion about 0.3ths of an inch is placed under an object glass of one inch, and secured in the usual manner by means of a disk, with dilute gum-water, the spiral forms are seen to dissolve gradually, and ultimately to form a yellow stain. On viewing it with a power of one-eighth, it appears to be a mass of curved spores, resembling in form caraway seeds, but invisible to the naked eye. Each spore has a life-like motion

confined to a center of its own. When they are treated to the action of nitric, muratic, and nitro-muratic acids, no immediate change is observable; and in those strong acids the life-like motion continues, which, I think, proves that the motions are not the result of any form of organic life, but simply what is known as "Brownian motion," which is frequently seen when minute particles of inorganic matters are placed under a high power. When the spores are combined either with concentrated sulphuric acid or caustic potash they become completely destroyed, forming a homogeneous mass, and their organic structure is no longer visible.

Plate 16.

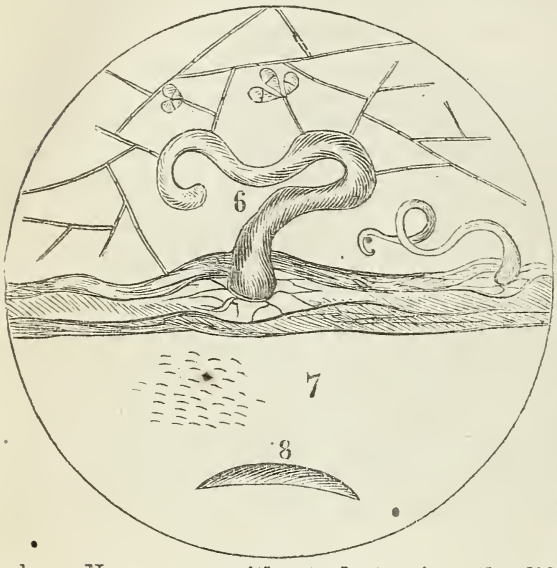


Plate 16 represents a sectional view of the bark. Figure 6, *Næmaspora*; 7, the same, when placed in water or acid, except sulphuric; 8, a very highly magnified form of the spores contained in Fig. 6.

About the 20th day mycelium was found in abundance growing from the spiral threads, (see figure 5,) resembling double-celled *Puccinia*, the spores, varying in number from 1 to 10, and so small that a power of one-eighth was required to give good definition. Since contact with water dissolves *Nœmaspora* without destroying the life of the spores, it is evident that the action of rain or washes of pure water will only tend to diffuse the spores over the body of the tree and roots, while the application of solutions of sulphuric acid and alkalies will destroy them. Hence a remedy may be found for peach-yellows in the application of alkalies and sulphates, and their compounds, to the bark and roots of the trees. Statements have frequently been made that the application of hot lye has been known to cure peach-yellows when applied to the bark and roots. My observations seem to confirm these common rumors.

In receiver No. 5 the healthy bark was not contaminated, seemingly, with the *Nœmaspora*, notwithstanding its immediate contact during several weeks with the unhealthy bark. As might be expected, the common molds, *Penicillium*, and *Mucors*, grew all over the surface of the specimens, healthy and unhealthy. The leaves in Nos. 3 and 4 were next examined. They had been subjected to the same treatment as the bark. The healthy leaves, although confined during four weeks in a moist atmosphere, at a temperature ranging from 80° to 90°, exhibited no signs of mildew. A split branch to which the leaves were attached exhibited a small portion of *Mucor* fruit, and *Mycelium* on the sap-wood and pith; but the unhealthy leaves were completely covered in two weeks with *Mycelium*, (mold,) and the fruit of the common blue, yellow, and black *Penicillium* and *Mucors*. I have repeated these ex-

periments several times, always with the same results. It is evident that the healthy leaves possess an antiseptic substance, which prevents the growth of the common molds on them. A portion of healthy and unhealthy leaves from the trees above mentioned was analyzed in the laboratory to determine the respective amounts of moisture, organic matter, and ash in them, and gave the following results:

Healthy peach-leaves:	
Moisture	29.20
Organic matter	63.22
Ash	7.58
	100.00
Unhealthy leaves:	
Moisture	36.9
Organic matter	59.4
Ash	3.7
	100.0

The fact of the absence of ash or solid matter and of the increase of moisture in the unhealthy leaves, would of itself account for their greater tendency to mold. Since leaves do not absorb earthy matter from the atmosphere, it is evident that the cellular structure of the tree has in some way failed to perform its functions; for, had the ascending sap carried with it potash, lime, or other earthy matter, the leaves would have been stored with them, since the leaves have no power to evaporate them. The deficiency of earthy matters in the leaves may also account for the absence of ash in the fruit. If the theory is well founded that the leaves elaborate juice for the growth of the fruit, the leaves being deprived of proper nourishment, the fruit cannot mature. It has been long observed that trees affected with the yellows fruit earlier and mature prematurely, and soon decay. The presence of a larger amount of sap in the unhealthy than in the healthy, indicates an earlier and greater flow than in that of the healthy tree. The presence of watery sap in the leaves, twigs, and buds would induce naturally an early growth of fruit and premature decay. From these and other observations the disease seems traceable to the body of the tree or roots. Applications of washes in this case to the leaves would probably prove useless, but if applied to the bark and roots, might prove curative; and for that purpose, judging from microscopic observations, I would recommend the frequent application of hot lye as the best substance.

FACTS FROM VARIOUS SOURCES.

Economy in the use of Fodder.—At a national convention of German agriculturists, chemists, physiologists, and directors of the experimental stations, held in 1871, Professor T. von Gohren presented his views on practical rules for the use of fodder. The following are the leading points in his discussion: In fixing such rules it is necessary to know, first, the general principles on which the desired results in feeding stock depend; second, the most economical means of attaining those results. Other things being equal, every method may be recommended which makes fodder more palatable and diminishes the tax on the digestive organs. It is necessary to distinguish between

food designed to sustain the existing condition of the animal and that designed, in addition, to lay on flesh, produce milk, supply the demands of labor, increase, &c. With regard to the former kind, the farmer may assume, as shown by the experiments of Wende, that the amount of nourishment needed for 100 pounds of live weight is from ½ to 1 pound of nitrogenous food, and from 7 to 8 pounds of food free from nitrogen, or of the same composition as starch. In regard to the other kind, we may make subdivisions with reference, 1, to work; 2, to flesh or growth; 3, to fat; 4, to milk; 5, to wool; 6, to increase.

For producing flesh an increase of food in substances not containing nitrogen is needed. Albumen must be furnished, and this can be done to the best advantage when the effect of oxygen in the circulation is reduced to its minimum, a result secured by the use of hydro-carbons, such as oils and oily grains, which are far cheaper than albumenoids.

For producing fat the farmer should use non-nitrogenous foods, because they are the cheapest. Fats can be produced from other fats, from hydrocarbons, and from albuminates; of these three ways, practical agriculturists will chose the least expensive.

For producing milk, if quantity rather than quality is aimed at, the lacteal glands must be stimulated to their greatest activity, and for this purpose food rich in nitrogen is needed; and since storing up fat is inconsistent with the activity of the superficial glands, to which the udder belongs, foods which contain a large amount of hydro-carbon must be avoided.

Wool-production, provided the animal be kept in good condition, seems to be independent of the kind of food. In a specific sense there is fat-producing food; but in that sense there is no wool-producing food. It appears from the experiments of Wolff that sheep will grow lean in body before the production of wool will be arrested. Professor von Gohren concludes his discussion in the following words:

The most important part of our labor relates to the increase of the race. Animals which are intended for labor must have a fully developed skeleton, ample room for the play of heart and lungs, and this can only be obtained by a full supply of food rich in albumen and iron. The development of the intestines should be restrained by concentrated food, that they may not interfere with the play of the lungs. Young cattle intended for fattening should be brought forward as fast as possible. According to Sauson and Claire Deville, early ripening depends, not so much on race, as on the composition of the bones; the sooner carbonate and phosphate of lime are deposited the sooner the animal will be ripe. To attain this end milk and grain must be fed.

The development of the chest viscera will be retarded by want of exercise and pure air, since this renders the labor of the lungs less. The development of the fourth stomach is promoted by food that is easily digested and full of fat. The opposite rule should be observed with young cattle intended for milk. The animal should be kept rather thin, and hence should not be allowed to suckle too long. Skimmed milk, hay, tea, &c., is much better food for calves intended for the dairy, as well as much cheaper, than the milk of the dam.

CROPS IN HUNGARY.—The Department of State has transmitted to this Department a report on this year's grain crops in Austrian Hungary, forwarded by Mr. John Jay, United States envoy at the imperial court of Austria, the same having been courteously transmitted to him by the Baron Orczy, acting minister in that court for foreign affairs. From this report it appears that agricultural products are classified in three grades: good, middling, and bad; that the country is divided into districts and sub-districts, having reporters and sub-reporters, who, in each instance, report the grain as belonging to the one of these grades which its condition justifies. The aggregate of these reports is as follows:

	Good.	Middling.	Bad.
Fall wheat	243	448	112
Fall rye	110	338	330
Beans	109	218	96
Rapeseed	79	167	140
Spring wheat	183	229	62
Spring barley	363	255	43
Spring oats	391	287	55

It will be seen that, on the whole, wheat, barley, and oats are much above, rye considerably below, and the other products not far from middling.

SOUTHWESTERN TEXAS.—Our correspondent resident at Kerr County, Texas, sends a communication respecting the climate, agricultural resources, and future prospects of that county and adjacent regions, from which the following statements are condensed. Though in the latitude of Southern Louisiana the altitude and rapid drainage of the region along the Upper Rio Guadalupe place it out of the reach of malarial influences, and the consequent special danger of losing time by sickness in the most pressing labor-season—that of harvest. Of the healthfulness of the climate and the rare beauty of the scenery, language cannot convey an adequate idea; in order to be appreciated, the elevated, pure, vitalizing atmosphere must be breathed, and the charming scenery, variegated by mountain, hill, slope, and vale, and by open meadows, alternating with groves of oaks of different varieties, and of other forest trees peculiar to Western Texas, must be seen. The Guadalupe, worthy its traditional reputation of being the most lovely river in Texas, and its beautiful tributaries of clear, pure water, afford unlimited water power and abound in fish of the finest quality.

For the production of cotton, corn, and the smaller grains, no part of the State is more favorable. Experiments in cultivating cotton have proved the locality to be unsurpassed in adaptation—a full bale to the acre being, not the rare exception, but the average yield. The yield of wheat, under the culture of intelligent and *progressive* farmers, is from thirty three to forty bushels per acre; and corn, this season, promises an abundant crop. Cereals mature from four to six weeks earlier than in the wheat-growing districts in the northern part of the State. The region is also unsurpassed in its adaptation for raising stock. The range of natural pasturage is extensive and of the best quality; it is watered with a plentiful supply of pure, flowing water; and the elevated surface, made up of hill and dale, is free alike from the oppressive heat of summer and the uninterrupted sweeping blasts of winter, to which the lower and more level tracts are subject.

At fruit-culture there have hitherto been only a few attempts; but the region is emphatically the native home of grapes. The evidence of this is seen in the fact that they grow wild in the greatest luxuriance, and in varieties which seem endless, "the mountain and hillsides being in many places covered, from base to summit, with dense masses of luxuriant vines, heavy with luscious burden, and all susceptible of improvement by judicious cultivation. It is wonderful to witness such exuberant growth of vine rooted amid rocks apparently untouched by earth or moisture." Apples, pears, peaches, plums, and cherries, recently introduced, all afford most favorable indications of thrifty growth and abundant yield.

To these favorable conditions of climate and soil are to be added the fact that timber and rocks for buildings and fences are abundant, and that a law of the State gives to each actual settler 160 acres of unappropriated land, on the condition that he occupy it three consecutive

years, without being absent within that period more than six months; and that within the counties of Kerr, Kendall, Kimball, Blanco, Menard, and Edwards there is now public domain on which thousands of 160-acre farms may be advantageously located.

The drawbacks which have hitherto operated to prevent this region from being rapidly settled are now fast passing away. Among these were remoteness from any great thoroughfare, the ever-present fear of depredations to which a frontier settlement was exposed from marauding Indians, the extraordinary occurrence of three "grasshopper-years" in succession—a pest now passed away, and not likely to return for the same length of time, at least within the present generation—and, to crown all, the decade of afflictions, crippled enterprise, and impoverished resources brought on by the late war; consequences from which the country is now happily recovering.

To disabuse the public mind of the erroneous impression as to the prevalence of drought in Western Texas, the following statistics of the amount of rain-fall at Kerrville, Kerr County, for each of the last four four years is given: In 1868, 46.60 inches; 1869, 49.03 inches; 1870, 35.12 inches; 1871, 24.85 inches.

Cultivation by steam in Europe.—At an agricultural meeting recently held in Scotland, some interesting statements were made respecting the origin, progress, and results of cultivation by steam in Europe. In 1855, a Mr. John Fowler, of Essex County, England, started his first steam-plow. He subsequently expended about $350,000 in experiments in cultivating by steam, and at the end of this great expenditure had to show for it only a lot of old machinery. But as early as 1858 the question whether, under certain conditions, such as a surface sufficiently level, free from obstructions, &c., plowing could be done more profitably by steam than by horse-power was satisfactorily settled. Now, in Great Britain, there are single establishments for manufacturing steam-plows so extensive that they furnish constant employment for not less than 1,200 men. In England, between 400 and 500 sets of steam-plows, held, some by companies and others by individual owners, are worked for hire, and are found to be a profitable investment. A tract of 500 acres, near London, so unproductive that it could not be rented for $3 per acre, was bought by an enterprising farmer who removed the fences, under-drained, and, with a steam-plow, put the whole into grain crops. Last year, after allowing 10 per cent. on the money invested in the land, his clear profits were $18,000. The soil he thus improved by deep steam-plowing is a stiff clay, that could not be profitably worked by horse-power. Another tract of 5,000 acres, that had been regarded as worthless, was bought by a farmer who plowed it with steam-power to the depth of 3 feet, and was rewarded by crops of astonishing thrift. In Scotland, cultivation by steam is becoming general, and producing results equally marvellous. Joint stock companies are investing in land and steam-machinery and securing large dividends, while individual farmers have invested from $6,000 to $10,000 in steam-machinery with very profitable results. In Germany, also, steam-power is working a revolution in agriculture.

In connection with the subject, it was stated that the Pasha of Egypt now employs on his extensive domain 400 steam-plows; and furthermore, in prosecuting this feasible mode of cultivating on a grand scale, is building, "on his farm," 400 miles of railway, and, for transporting and manufacturing the raw material produced, has ordered thirty locomotive-engines and $3,000,000 worth of sugar-machinery.

Loss of fertilizing properties in hen-dung.—In Italy the manure of fowls and pigeons is an article of commerce. Professor Sestini has been examining the comparative values of fresh dung and of that which is sold, and finds the principal difference to be that fresh dung contains 64 per cent. of water, while the commercial article has only 25, or less. By long exposure to dry air, five-sixths of the ammonia was dissipated. To prevent this loss, experiments were made with plaster, green vitriol, and clay, finely pulverized, and exposed to ammonia vapor for twenty-four hours. The vitriol absorbed 5.5 grams, the plaster 5 grams, the clay 4.9 grams. These substances were next mixed with fowl-dung, and exposed for a month in chambers where the escaping gases could be collected, with similar results. A strong odor of ammonia could be perceived arising from the clay mixture, but very little from the other two. Fungi developed rapidly on the mixtures of clay and plaster, but not on that containing vitriol. It is well known that these parasites depreciate the value of nitrogenous manures. The practical deductions were, that the dung should be collected weekly and placed in covered vessels, each layer being sprinkled with about 5 per cent. of green vitriol. As to its commercial value, it is much poorer than guano in nitrogen and phosphates.

Demand for agricultural implements in New South Wales.—Mr. Jules Joubert, secretary of the Agricultural Society of New South Wales, in an official communication addressed to this Department, represents that in that colony there is an urgent demand for improved agricultural implements and labor-saving machinery; but as yet it has neither the facilities nor the requisite skill for manufacturing them. Hitherto imports from this country have been limited to lumber, furniture, and a few land-mills; but he expresses the opinion that a well assorted exhibition of American implements, inventions, and labor saving machinery would not only be a great attraction in the colony, but result in opening an extensive and profitable market for most of the articles exhibited. He is instructed by the society to state that, should any responsible individual or company in the United States desire to make trial of the plan suggested as a business enterprise, they have a spacious building adapted to the purpose, located in the Prince Albert park, Sydney, which would be placed at the disposal of the same, together with every other facility at their command.

Irrigation in Colorado.—A correspondent from El Paso County, Colorado Territory, reports that irrigation of the natural grasses is coming into practice, and enough has already been done to demonstrate that in the course of three or four years upland can thus be made to produce from two to three tons of hay per acre; the natural grass giving place to the blue grass, which makes excellent hay.

Epizootic aphthæ.—This disease is reported as spreading in Marion County, Arkansas; but it is in a mild form, and very few cases prove fatal.

Relations of local diseases to the nature of the soil.—Dr. Moffat has read before the British Association a paper on the above subject, in which he shows that the nature of the soil exercises considerable influence on the character of endemic disease. His district lies on the carboniferous and red, or Cheshire, sandstone formation. Anæmia is the prevailing condition of the inhabitants of the carboniferous land, who are both miners and farmers, while it is almost unknown on the red

sandstone. Consumption is also more prevalent in the first-named district. Since anæmia is a want of iron in the blood, Dr. Moffat examined the constitution of wheat grown on the Cheshire sandstone, and found it produced much more ash, and hence a larger proportion of mineral constituents, including oxide of iron, than that grown on the corboniferous soil. He estimates that a pound of wheat from the first furnishes five grains more of oxide of iron to the consumer than a pound of wheat from the second soil, which accounts for the comparative poverty of the blood of the miners in iron and phosphoric acid. An examination of the blood of the animals kept in the two districts confirmed the above observations.

REMEDY FOR SPANISH FEVER.—A Kansas farmer professes to have treated with invariable success cattle affected with Spanish fever, according to the following recipe:

When the animal loses its appetite and becomes stupid, take several gallons of tepid water, for a full-grown steer, and inject it from a large syringe; and in about twelve hours give from a half pint to a pint of linseed-oil, to move the bowels, and the ox will get well.

He claims that the above recipe produces a reaction, softens the parts, and restores the normal action of the system.

CHANGE IN THE COURSE OF RAIN.—A correspondent writing from Hawkins County, Tennessee, states that ordinarily, in that locality, the rains all come from the southwest, conforming to the direction of the rivers and mountains; but what little rain has fallen during the dry season, both last year and this, has all come from clouds passing from north to south, directly across the rivers and mountains. Scientists are asked to account for this change of direction. The droughts, during which the change occurs, are not owing to the absence of forests, for the country is heavily timbered.

TOBACCO IN SANTA CLARA COUNTY, CALIFORNIA.—Mr. J. D. Culp, of Gilroy, Santa Clara County, California, who has had much experience in tobacco-culture, claims to have a method of raising and curing it by which it is made equal to the best imported Havana, and this claim is indorsed by certificates from leading tobacco houses in San Francisco. He has secured the aid of capitalists, and is preparing for extensive operations. His crop of 1871, on five acres, planted with Havana seed, amounted to 8,000 pounds. In illustration of the fertility of his soil, he states that he has raised on the same land, without manure, twelve successive crops of tobacco, the last being fully equal to the first, and the land exhibiting no deterioration. He has been at no expense for protection against tobacco-worms, wasps having destroyed them on appearance.

INDUSTRIAL EDUCATION.—The board of regents of Kansas Agricultural College are reported as having adopted a new curriculum, comprising agriculture, horticulture, stock-breeding, veterinary science, farm economy, mechanics, and architecture.

MERINO RAMS FOR COLORADO.—It is reported that 800 Spanish merino bucks, selected from among the purest blooded flocks in Rutland and Addison Counties, Vermont, have recently been purchased for shipment to Southern Colorado. Three hundred are for Thomas O. Boggs, of Bent County, designed to supplant the long-wooled bucks from Canada, which he has tested for the last two years. Having tried Cotswold, Leicester, Southdown, and the Vermont merino, he decides unhesitatingly that the latter are the best for crossing with Mexican

sheep. Another 300 are for Messrs. Ripley & Thomas, of the same county, and the remainder for the general market. They are to leave Vermont about the 1st of October.

Effect of climate and soil on the European larch.—Professor J. Mathews, of Iowa Agricultural College, is reported as having experimented with this tree, in Iowa, for the last seventeen years, with results quite satisfactory, respecting the rapidity of its growth, but unfavorable respecting its durability. He has one tree 45 feet in height and 15 inches in diameter one foot above the ground. Many others are from 15 to 30 feet in height. In 1869, he cut several trees and manufactured them into grape-stakes, setting them about the 1st of May. In April last, he found them all so decayed that they either had fallen or would break with a slight pressure. Assuming that its durability depends upon its peculiarity of texture, together with the amount of resinous substance it contains, he cites authorities to show that it undergoes great changes in these and other respects as the result of differences in climate, location, and soil. In the most northern regions in which it is found, it is only a trailing shrub, while upon the Alpine hills, and in other congenial localities, it grows to the height of 100 feet and more. He quotes from a circular, published in 1869, by E. Y. Teas, as follows:

> In Savoy, according to a French writer, houses are built of larch-logs, squared and placed one upon another, in the style of our American log-houses. The heat of the sun melts the resin contained in the logs, and the structure, thus rendered impervious to air and moisture, will last for centuries. In some parts of France houses are now standing that have been built two hundred and fifty years, and still show no signs of decay; the great amount of resinous matter rendering the wood imperishable; and on this account it will outlast red cedar. There seem to be well authenticated instances in Europe in which larch-timber, having been in use for a thousand years, still remains sound.

He further quotes from Loudon's Encyclopedia statements that resinous timber indigenous to cold regions loses the qualities on which its durability depends when transferred to a warm climate and fertile soil, and that a certain degree of coldness of climate and inferiority of soil is essential for producing larch-timber in perfection. Whether upon our rich prairie soils it will lose durable properties is a practical question upon which further light is needed.

Hops in England.—According to the estimates of the Mark Lane Express 65,600 acres are devoted to the culture of hops in England, and the area is gradually increasing. Kent, the largest hop-growing county, had 32,000 acres in this crop last season, the early grounds averaging 1,400 to 1,600 pounds per acre; Sussex, next in importance, 14,500 acres, averaging 1,800 to 2,200 pounds per acre. Surrey is noted for a choice quality of hops of bright color and superior aroma.

Grass cultivation at the South.—Many southern farmers are diligently adapting themselves to the new order of things by modifying their system of culture. Cotton, in some districts, is even now regarded as of secondary consideration, and the cultivation of a diversity of crops has been entered upon with commendable zeal. An enterprising farmer in Mississippi has instituted experiments in raising fruit and in seeding down a portion of his land to grass, both of which appear to have been quite successful. His orchard, embracing winter-apples, has already become a source of profit, and his success with grasses has been such as to constitute him a strong competitor with the hay-makers of the North. He has been especially successful in clover, obtaining a luxuriant growth of three tons to the acre. Having failed in seeding with small grain, he adopted the method of securing a stand of clover by

first planting peas, and then following up the crop with a dressing of manure. And this is not an isolated case. Other similar experiments in Mississippi are said to have removed the doubts of skeptics, and to have confirmed the most ardent believers in the success of cultivated grasses at the South. A writer in the Rural Alabamian relates an instance of remarkable success in the growing of clover, at Tibby, in Lowndes County, Mississippi, to which it might be difficult to find a parallel at the North. Upon a field seeded fifteen years ago to clover, and which has repeatedly produced both grain and hoed crops since, the clover crop last year was a most luxuriant one, although the field has never been seeded to clover but the one time.

In a very comprehensive and practical article on the cultivation of the grasses and forage plants of the South, Mr. C. W. Howard, in the Southern Farm and Home, Memphis, Tennessee, says, concerning lucerne:

> As a forage-plant at the South, lucerne is very far superior to all others. It is used for three purposes. First, for feeding green, or soiling; used in this way, it is best to cut the lucerne a day in advance, so as to feed it in a wilted state. *It must never be pastured.* * * * * * Lucerne hay is extremely nutritious, and is relished by horses, cattle, and sheep. It is preferred by the domestic animals to any other kind of hay. The product of lucerne is enormous. Five tons of excellent hay may be cut from an acre. It is estimated that fodder, green and dry, may be obtained from an acre of lucerne for the support of five horses during the entire year. This included the great bulk of green food during the spring, summer, and autumn."

The seed of lucerne has been very widely distributed by the Department; and the most favoroble accounts of success in its culture have been returned.

THE STOCK TRADE OF BUFFALO.—Mr. Ch. Bevichy, a stock-dealer of Buffalo, New York, writing under date of July, says:

> The stock-trade of this city has been of rapid growth and is increasing. In 1857 the total number of animals was 533,220. Since that date the trade has steadily grown and promises to continue to increase. From this point these animals go by railroad to Philadelphia, New York, and Boston, and the intermediate lage towns, there awaiting the turn of those markets. When the Northwest and Manitoba come to send out cattle and horses it is thought they must come here for distribution. Those regions, it is said, will rival Texas in cattle-raising, notwithstanding the severity of the climate. The cattle, &c., from Northern Minnesota, Dakota, and Manitoba must pass east by rail along the southern shore of Lake Superior to the Sault Ste. Marie, and then through Canada to this city. The whole distance from the Red River (an average point about one thousand miles) to Buffalo will be less than from Kansas, from which State many of our cattle come; and it is plain that sheep, horse, and cattle raising will have to be the main reliance of the people of the Northwest, whose broad, grassy plains never fail to produce food for winter and summer supplies.

CATTLE-PLAGUE.—The cattle-plague, or rinderpest, or steppe-disease, as it is variously called, has reappeared in England, where, when it first appeared, several years ago, the place of its origin was investigated without any positive result. It was commonly believed, however, to have been imported from Russia. In reference to its source at the present time, the evidence is less doubtful. Three cargoes of infected animals recently arrived in England directly from Russia. Prompt and effective measures were taken to prevent the spread of the decease, and an order of government was at once issued forbidding the landing thereafter at any port in Great Britain of cattle from any place within the Russian dominions. The deceased animals were killed, and a careful *post mortem* examination left no doubt of their having been infected with the cattle-plague. It was shown that symptoms of the disease had manifested themselves at the time the animals were embarked; that several animals had died at sea; that fresh outbreaks of the disease

were occurring in the Baltic provinces of Russia, where severe losses had been sustained in many districts; and that no precautions had been taken, apparently, to prevent the spread of the disease. One hundred cattle are said to have perished in Novgorod alone. The plague is also reported to exist in Galicia, in Lower Austria, in Scutari, and in Circassia, whence it would naturally spread to the Crimea.

AGRICULTURAL AND MINERAL RESOURCES OF WESTERN TEXAS.—A committee of the Western Texas Agricultural, Stock-Raising, and Industrial Association, writing to the Department, say:

> We feel assured that in the production of wool, cotton, corn, wheat, oats, rye, barley, ramie, beef, hides, tallow, wax, mesquite gum, pecan-nuts, &c., Western Texas can successfully compete with any equal portion of the earth's surface; also in valuable minerals such as iron, coal, lead, silver, gold, copper, bismuth, gypsum, mica, kaolin, steatite, molybdenite, asbestos, malachite, pipe-clay, marble, calcite, &c. We have also among our citizens those who have given proof of mechanical and industrial genius.

FOOT AND MOUTH DISEASE IN ENGLAND.—Foot and mouth disease is prevailing to an alarming extent in England, especially in Norfolk, Cumberland, Dorsetshire, Huntingdon, Westmoreland, and Yorkshire. English official reports recently issued show 691,565 animals attacked by the disease in 1871, and at the present time it is even more widely spread and of unusual virulence. Frequently animals are attacked the second or third time, and in many districts there is a considerable percentage of deaths. About the 1st of August, returns for the week showed from Northamptonshire 9,454 cattle and sheep affected; from Buckinghamshire, where the disease was rapidly spreading, 13,743, distributed among 396 farms; from Norfolk, 13,000; from Dorsetshire, 11,050. In the early part of July the council of the Royal Agricultural Society authorized the expenditure of a sum not exceeding £100 for investigations into the causes of periodic outbreaks of this disease in England, particularly among importations from Ireland.

COTTON IN CALIFORNIA.—A movement for introducing the culture and manufacture of cotton into California, upon an extensive scale, is now in apparently successful progress. A "Cotton Growing and Manufacturing Association" has been incorporated for the purpose, under the auspices of which a selection has been made of the valley of the Kern River as specially adapted to the object, possessing a favorable soil and climate, and ample water-power for manufacturing purposes. Ten thousand acres of land, including a town-site with considerable improvements, have been purchased, and successful experiments in raising cotton have already been made. The town is located at the foot of the Sierra Nevada Mountains, and the lands are available for immediate planting; and the property is said to embrace peculiar facilities for promoting the growth of this special producing and manufacturing industry.

THE CRANBERRY-CROP IN NEW JERSEY AND MASSACHUSETTS.—The cranberry crop of New Jersey is reported much below an average, and that of Cape Cod, Massachusetts, almost a total failure, a large proportion of the vines having been killed last winter, and the remainder greatly ravaged by worms.

POTATO-ROT IN ENGLAND.—Potato-rot is prevailing to an alarming extent in England, and fears are entertained that much the greater part of the crop will be destroyed. But it is stated that districts where the atmosphere is impregnated with vapors from smelting-works are comparatively free from the disease.

ENGLISH SPARROWS IN AUSTRALIA.—It appears from complaints received by the Royal Horticultural Society that fruit-crops in Australia have been seriously injured by the English sparrows imported into that country.

EXPERIMENTAL STATIONS.—The system of agricultural experimental stations is rapidly extending in Italy. In consequence of information obtained and circulated by the minister of agriculture, respecting the experimental stations in Germany, seven new stations have been established on the German model. These are located at Undine, Modena, Milan, Lodi, Padua, Florence, and Turin.

AGRICULTURAL SPECIALTIES IN NORTH CAROLINA.—Mr. J. L. Labiaux, a native of France, now residing at Ridgway, North Carolina, writes us that he is making efforts for the introduction into his section of experts in various agricultural specialties. He commenced by arranging for the settlement of two of his countrymen, skilled gardeners, lately employed near Philadelphia. Their capital being too small to purchase and stock land, Mr. Labiaux negotiated for them a partnership with a citizen of Raleigh, for five years, on terms mainly as follows: The latter furnished 66 acres of land near Raleigh, valued at $40 per acre, and $1,000 for horses, implements, seeds, manures, &c. The interest on this capital is to be an equivalent for the labor of his copartners who are privileged to borrow from the company's funds $15 per month, each, for the first six months, as a provision for their sustenance meanwhile. At the expiration of the partnership, the entire capital advanced is to be repaid by the company, when the surplus accumulated will be equally divided. The arrangement was perfected last November, and, at this time, is working to the satisfaction of all parties concerned. Since the inauguration of this enterprise, Mr. Labiaux has formed other associations of like character, one of which is a partnership between himself and Mr. V. Clerc, from Vaucluse, France, chiefly for the purpose of viniculture; but the latter being an expert in the culture of madder, it is intended to devote four or five acres to that specialty.

Mr. Labiaux further informs us that a steam fruit-drying establishment has been recently erected at Ridgway. It uses the "Baltimore process" of pneumatic evaporation, claimed to be covered by the patents of Marshall P. Smith, of Baltimore, Maryland, and identical with that commonly known as the Alden process.

THE NEW YORK MEAT-MARKET.—The following are the chief points of a recent article in the New York Times, giving some statistics of the New York meat-market: The markets of the city require weekly 8,000 to 9,000 cattle, 3,000 calves, and about 26,000 sheep. The first-class beeves of the New York market are mainly Durham grades, (as in London,) and there is no considerable proportion of these where the grade is higher than half-blood. Illinois, Missouri, and Kansas are the most important sources of supply, both in quantity and quality. The evils attendant on cattle transportation are still severely felt. Cattle continue to be transported in crowded and badly constructed cars, in which they cannot be either fed or watered without much loss of time. As a consequence they become restive, and before reaching the journey's end many of them are so badly bruised that when they are slaughtered large portions of their meat are unfit for use. The improved trucks which were temporarily used on one or two lines of road have been set aside, because they could not be quite as quickly loaded and unloaded, nor packed with as large a number as in the case of the common trucks.

The quality of the mutton and lamb brought to the New York market is, as is well known, greatly inferior to that of like meats in the London market. The price of wool greatly affects the number of sheep marketed. In 1870 the weekly supply was nearly 50,000; in 1871 the number was little more than half as large. Lancasters and Cotswolds, from Canada, lead in quality, and these are received from September to January. A few of a similar quality are received from Kentucky in the winter. Ohio sends the largest number of sheep—merinos to a considerable extent, and of good quality. The sheep received from Michigan have more merino blood and rate lower in weight and quality. The Illinois and Iowa sheep are rather coarse, and those from Indiana are among the poorest received. Spring-lambs come chiefly from New Jersey, Maryland, and Delaware, the earliest arrivals having the advantage, even if not of best quality. Summer and autumn lambs come chiefly from the States of New York and Kentucky, very few being received from the other States.

JUTE.—A correspondent at Augusta, Georgia, under date of August 31, 1872, represents that the jute-plant has done well in that locality, and that he hopes to raise enough seed to test its adaptation to that climate. Another at New Orleans, Louisiana, states that the jute-plant succeeds well, and that the ramie-cleaning machine is well adapted to the preparation of jute. The Southern Ramie Planting Association, in the same city, has also had encouraging success from jute-seed received from this Department. A specimen of the fiber, transmitted by E. Lefranc, president of the association, is about 4 feet long and of considerable tenacity. This was prepared by a ramie-cleaning machine.

FIGS.—A correspondent at Westport, Jackson County, Missouri, reports that eight of the fig-cuttings, received from the Department in November last, have made a growth of over 4 feet. He therefore expresses the hope that with proper care figs can be grown in Missouri.

CLOVER IN SOUTH CAROLINA.—A correspondent writing from Pomaria, Newberry County, South Carolina, represents that exclusive cotton culture is giving place to more diversified production. In evidence that this section is adapted to the growing of grasses, he states that in May last, from 2½ acres of stiff, red upland, he cut 10,000 pounds of fine red clover hay. His success has occasioned an extensive demand in the region for red-clover seed.

FULTZ WHEAT IN PENNSYLVANIA.—Mr. William Huber, of Chambersburgh, Pennsylvania, reports that last fall, on a field of 6 acres, limestone soil, with gravel, which had been in corn and potatoes the preceding season, he drilled in 1½ bushel of Fultz wheat per acre, applying no manure. A dressing of barn-yard manure had been applied for the potatoes, but no fertilizer had been used since then. From this field he has obtained 231.3 bushels of wheat, by weight, or a litttle more than 38½ bushels per acre, besides a yield of good straw amounting to about 1½ tons per acre. The yield was especially remarkable in view of the greatly reduced yield of the general crop.

TIMBER-PLANTING IN NEBRASKA.—In Hall County, Nebraska, timber-planting has become quite popular. It is predicted by our correspondent that within twenty years the "Great American Desert" will be far better timbered than the Eastern States.

HOPS AND CRANBERRIES.—These are reported as two of the most important farm-products in Juneau County, Wisconsin. This season the

hop crop will be light, but promises to be of superior quality, with no sign of vermin or blight. Of cranberries, which are extensively cultivated, there is every indication of an abundant crop. In Monroe County, also, several thousand acres of wild cranberries are reported as promising above the average of former years.

SPARE THE BIRDS.—Our correspondent in Perry County, Illinois, after mentioning the extensive ravages of the chinch-bugs, sweeping the most promising crops, states that, in Southern Illinois, during the last winter, quails were slaughtered by the thousand dozen for market. As they have been almost annihilated in that region, insects abound. He thinks this criminal folly should be repressed by vigorously executed legal enactments.

MARKET GARDENING IN KENTUCKY.—The western portion of Jefferson County, Kentucky, is largely devoted to gardening under the energetic and intelligent management of the Germans, who have very successfully developed this branch of industry. The proximity of the city of Louisville affords a large supply of organic fertilizers, enabling the cultivators to secure two crops per annum from the same ground.

MILK FEVER.—Our correspondent in Pulaski County, Illinois, describes a case of milk fever in one of his cows, the symptoms of which were swelling and heat in one side of the udder, the second day after calving. The calf was admitted to her, but the swelling increased, as also did the febrile symptoms, resulting in great prostration and trembling, with partial loss of motion in the limbs. Though there was no stricture of the bowels or lack of appetite, mild antimonial doses were administered, with epsom salts and aromatic herbs, producing an active cathartic effect. Cold water was applied to the inflamed parts, and afterward a mild mercurial ointment, mingled with pulverized camphor and tincture of iodine. The cow has recovered, with a partial loss of milking capacity in one teat. Our correspondent recommends the reduction of food, and even occasional neck bleeding, as the calving-time approaches.

FRUIT CULTURE IN KENTUCKY.—Trimble County, Kentucky, is becoming the theater of extensive fruit culture. Two parties from Cincinnati have lately set out an orchard of 400 acres, and other enterprises on a similar scale have been projected. One apple-orchard of 125 acres has just commenced bearing. The prospect is that within a few years half the high lands of the county will be under fruit cultivation.

CLOVER IN THE SOUTH.—Our regular correspondence shows the rapid increase of this crop in several portions of the South. While one variety suits one section, another is found profitable elsewhere. Clover, as a field crop, has been found a great success in large areas. It is found, also, in some locations, to be one of the best paying crops.

BAD FINANCIERING.—A Georgia correspondent states that the farmers in his region have in many cases mortgaged their crops for provisions for the coming year and for fertilizers. A short crop of cotton will ruin large numbers of them. A correspondent in another county of this State says that the cotton mania has broken out with fresh virulence among the planters. Not less than 200 tons of guano have already been purchased, mostly on credit, for the quickening of the cotton-crop. Here, also, planters are mortgaging their crops for provisions.

SETTLEMENT OF WASHINGTON TERRITORY.—The settlement of Western Washington is proceeding at a rapid rate. A hundred new farms were lately opened in one week, and a greatly increased acreage of land has been placed under cultivation in the Chehalis Valley alone.

MALFORMATION OF CALVES.—A regular correspondent in Monterey County, California, notices "a remarkable disease this spring among calves on some dairy and stock ranches." The cows producing them are a cross between the native and the Durham breeds. The calves are born deformed, rickety, with large heads and joints; legs weak and spreading at an angle from 10° to 30°; many cannot walk at all. By being held up to suck they often gain strength and are able to walk. Many are still-born. The cases are limited to a few ranches and are supposed to represent the progeny of diseased bulls. Some ranchmen and dairymen think they are the result of pregnant cows feeding upon acorns in autumn. Sheep, goats, deer, and other animals eat freely of the acorns without injury. The water of these ranches is excellent.

PROPORTION OF SEED AND CULTURE FOR A CROP OF POTATOES.—A correspondent at Albany, New York, is of the opinion that, in raising potatoes, farmers generally err in two respects: they use too much seed and give the land too little tillage. In illustration of his view he gives the results of an experiment. His tenant, in selecting Early Rose potatoes for planting, had thrown out all not larger than an English walnut. He gathered 22 quarts of the rejected ones, cut them in two or more pieces according to size; planted, without manure, in ground of ordinary tilth; cultivated and hoed them thoroughly three times, and dug 68 bushels, by measure, of unusually large potatoes.

FESCUE GRASS IN TEXAS.—A correspondent in Montgomery County reports that the fescue grass proves to be of great value. In illustration he states that on less than two acres four mules and two milch cows, besides hogs, were pastured all winter, and adds that there is a perceptible difference in the flavor of milk and butter after pasturage on this grass.

METEOROLOGY IN COLORADO.—A report of meteorological observations, for the month of August, kept at Colorado Spring, seventy-five miles south of Denver City, (the present terminus of the narrow-gauge railroad between Denver and Rio Grande,) the latitude of which is about 39°, and the elevation 6,000 feet, contains the following interesting facts: The lowest mean temperature on any day was (29th) 50°.5; the highest, (20th,) 74°.5; the average for the month, 68°.3; the amount of rain, 4.02 inches, of which 2.92 inches fell during the last six days, on each of which rain fell. At this location, under date of September 9, vegetation of all kinds is reported as growing luxuriantly, corn as a heavy crop, and wheat harvested in good condition, considering the frequent rains.

FARMING IN IOWA.—James P. Coulter, of Johnson County, raised last year 12,000 bushels of corn, 2,000 of oats, 500 of wheat, 900 of timothy-seed, and 600 of flax-seed; keeps 300 hogs, 40 cattle, 18 horses, and has 640 acres of prairie-land under cultivation.

EXTRAORDINARY YIELD.—It is reported that of Fultz wheat sent by this Department to Botetourt County, Virginia, Mr. Grayhill sowed 3½ pounds on the 16th of October, and harvested the crop on the 29th of July last. It yielded 5½ bushels by measure, the whole weighing 333 pounds.

TWO CROPS IN ONE SEASON IN ALABAMA.—A correspondent in Franklin County gives the following facts: April 22, he sowed one acre in Hungarian grass; by June 19 it was fit to cut; he took off the crop, and planted corn June 30, and it made 30 bushels. March 15, he sowed four acres of Norway oats; cut a very heavy crop July 1; planted the land to corn on the 12th and 13th, and made fully 30 bushels. The land on which this experiment was made had been under cultivation thirty-five years, and the season was unusually dry.

A HOG DISEASE AND ITS REMEDY.—A correspondent in Shelby County, Kentucky, describes a disease (which he calls cholera) prevailing in that section among hogs, and gives a remedy. Its symptoms are a hacking cough and "hard and marble-like excrement." Soon as these are noticed administer calomel, in the proportion of half a pound to every fifty shoats, mixed with corn so moistened that it will adhere. This is designed to change the action of the bowels, and if that effect does not follow in due time the dose must be repeated. Next, mix in troughs salt, wood-ashes, and coal-tar, in the proportion of 7 parts of salt, 7 of ashes, and 2 of tar. The hogs will soon become fond of it, and the effect will be to remove from them all vermin, and keep them generally in a healthy condition. This, he testifies, has been found by all who have tried it efficacious both as preventive and remedy.

CHICAGO STOCK MOVEMENTS.

A statement of the receipts and shipments of the Union Stock Yards of Chicago has been received from Mr. George T. Williams, assistant secretary, which is presented in detail, as follows:

RECEIPTS.

CATTLE.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	7,374	7,136	9,990	11,385	14,164	9,141	59,190
Illinois Central Railroad	8,849	7,654	8,745	6,369	6,610	6,726	44,953
Chicago, Burlington and Quincy Railroad	12,280	10,460	15,510	23,143	29,796	26,019	117,208
Chicago and Northwestern Railway	8,572	9,320	11,093	8,700	10,366	8,125	56,176
Chicago and Alton Railroad	6,565	5,500	6,953	8,381	8,992	11,696	48,087
Pittsburgh, Fort Wayne and Chicago Railroad	145	113	90	79	3	4	434
Michigan Central Railroad	34	30	5	31	31	8	139
Michigan Southern Railroad	241	69	212	63	114	335	1,034
Pittsburgh, Cincinnati and Saint Louis Railroad	104	74	126	49	131	308	792
Chicago, Danville and Vincennes Railroad	793	541	263	158	233	755	2,743
Driven into yards	33	190	183	35	1,260	326	2,027
Total	44,990	41,087	53,170	58,393	71,700	63,443	332,783

HOGS.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	59,635	44,351	31,057	32,307	47,085	56,720	271,205
Illinois Central Railroad	63,182	39,449	28,354	29,341	49,783	45,554	255,663
Chicago, Burlington and Quincy Railroad	131,171	99,904	51,269	53,721	83,526	76,540	496,131
Chicago and Northwestern Railway	65,678	56,636	36,637	24,644	42,193	40,513	266,301
Chicago and Alton Railroad	29,993	22,768	20,352	25,113	34,866	29,198	162,290
Pittsburgh, Fort Wayne and Chicago Railroad	2,001	384	51	332	161	159	3,088
Michigan Central Railroad	3,000	800	198	503	359	55	4,915
Michigan Southern Railroad	2,677	1,085	1,087	1,013	1,436	957	8,255
Pittsburgh, Cincinnati and Saint Louis Railroad	1,266	589	271	325	1,205	701	4,357
Chicago, Danville and Vincennes Railroad	3,259	2,132	1,509	1,794	4,645	4,309	17,648
Driven into yards	23	138	736	56	.....	8	225
Total	361,935	268,236	170,785	169,149	265,259	254,714	1,490,078

SHEEP.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	9,518	9,645	7,041	4,775	1,997	2,383	35,359
Illinois Central Railroad	8,812	6,232	5,390	4,341	2,925	2,786	30,486
Chicago, Burlington and Quincy Railroad	12,336	15,118	13,340	8,285	5,253	4,568	58,900
Chicago and Northwestern Railway	3,965	4,378	6,216	2,096	3,414	1,720	21,789
Chicago and Alton Railroad	3,139	3,030	3,374	4,116	2,184	410	16,253
Pittsburgh, Fort Wayne and Chicago Railroad.	185	237	.....	.....	31	102	555
Michigan Central Railroad	318	496	52	473	86	120	1,545
Michigan Southern Railroad	2,140	1,650	1,481	250	187	756	6,464
Pittsburgh, Cincinnati and Saint Louis Railroad.	59	.....	.....	82	105	106	352
Chicago, Danville and Vincennes Railroad	1,597	1,017	540	353	207	825	4,539
Driven into yards	.....	.....	736	.....	.....	.....	736
Total	42,069	41,803	38,170	24,771	16,389	13,776	176,978

HORSES.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	104	287	233	162	283	48	1,117
Illinois Central Railroad	126	305	320	251	207	190	1,399
Chicago, Burlington and Quincy Railroad	132	285	573	476	575	248	2,289
Chicago and Northwestern Railway	123	423	408	498	513	347	2,312
Chicago and Alton Railroad	78	71	29	124	50	169	521
Pittsburgh, Fort Wayne and Chicago Railroad.	.....	.....	.....	.....	.....	.....	.....
Michigan Central Railroad	.....	16	13	12	35	5	81
Michigan Southern Railroad	14	12	36	6	22	9	99
Pittsburgh, Cincinnati and Saint Louis Railroad.	.....	.....	.....	2	.....	.....	2
Chicago, Danville and Vincennes Railroad	.....	1	18	.....	.....	2	21
Driven into yards	.....	.....	.....	.....	.....	.....	.....
Total	577	1,400	1,630	1,531	1,685	1,018	7,841

SHIPMENTS.

CATTLE.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	469	228	221	624	185	722	2,449
Illinois Central Railroad	552	992	1,001	683	371	410	4,009
Chicago, Burlington and Quincy Railroad	541	1,083	580	302	239	726	3,471
Chicago and Northwestern Railway	142	295	470	405	314	425	2,051
Chicago and Alton Railroad	1,032	1,096	207	812	189	1,180	4,516
Pittsburgh, Fort Wayne and Chicago Railroad	11,956	12,826	15,925	16,981	24,615	18,764	101,067
Michigan Central Railroad	3,488	5,539	5,321	7,108	7,641	8,565	37,662
Michigan Southern Railroad	14,511	13,312	19,783	25,466	33,445	21,543	128,060
Pittsburgh, Cintinnati and Saint Louis Railroad	356	775	197	93	40	.....	1,461
Total	33,047	36,146	43,705	52,474	67,039	52,335	284,746

HOGS.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	.....	.....	165	.....	13	.....	178
Illinois Central Railroad	.....	52	.....	.....	.....	.....	52
Chicago, Burlington, and Quincy Railroad	154	.....	.....	.....	183	.....	337
Chicago and Northwestern Railway	.....	56	6	63	219	259	603
Chicago and Alton Railroad	.....	.....	.....	.....	.....	4	4
Pittsburgh, Fort Wayne and Chicago Railroad	8,451	20,223	31,256	37,733	41,662	52,272	191,597
Michigan Central Railroad	30,086	31,463	50,179	54,632	87,326	83,706	337,392
Michigan Southern Railroad	39,646	52,353	62,603	52,723	67,048	70,699	345,072
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	521	.....	.....	.....	.....	521
Total	78,337	104,668	144,209	145,151	196,451	206,940	875,756

SHEEP.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	160	181	.....	196	182	100	819
Illinois Central Railroad	.....	590	.....	.....	.....	.....	590
Chicago, Burlington and Quincy Railroad	.....	.....	.....	165	.....	100	265
Chicago and Northwestern Railway	.....	196	9	21	48	587	861
Chicago and Alton Railroad	.....	52	49	152	.....	355	608
Pittsburgh, Fort Wayne and Chicago Railroad	20,481	18,827	19,796	9,406	2,701	832	72,043
Michigan Central Railroad	2,594	5,244	8,382	871	274	.....	17,365
Michigan Southern Railroad	.....	102	1,259	6,517	2,740	1,519	12,137
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	156	.....	.....	.....	.....	156
Total	23,235	25,348	29,495	17,328	5,945	3,493	104,844

HORSES.

	January.	February.	March.	April.	May.	June.	Total for six months.
Chicago, Rock Island and Pacific Railroad	.....	.....	3	.....	.....	4	7
Illinois Central Railroad	1	10	2	.....	2	.....	15
Chicago, Burlington and Quincy Railroad	4	1	14	6	2	.....	27
Chicago and Northwestern Railroad	16	65	102	53	163	51	450
Chicago and Alton Railroad	22	46	.....	8	20	.....	96
Pittsburgh, Fort Wayne and Chicago Railroad	151	391	248	247	212	245	1,494
Michigan Central Railroad	15	.....	144	174	203	109	645
Michigan Southern Railroad	213	610	957	906	953	512	4,151
Pittsburgh, Cincinnati and Saint Louis Railroad	.....	.....	15	.....	.....	.....	15
Total	422	1,123	1,485	1,394	1,555	921	6,900

MARKET PRICES OF FARM PRODUCTS.

Articles.	August.	September.
NEW YORK.		
Flour, superfine State ..... per barrel..	$5 55 to $5 90	5 85 to 6 00
extra State ..... do.....	6 65 to 7 50	7 00 to 7 90
superfine western ..... do.....	5 55 to 5 90	5 85 to 6 45
extra to choice western ..... do.....	6 50 to 10 75	7 00 to 10 40
extra southern ..... do.....	7 10 to 9 00	7 00 to 9 75
good to choice southern ..... do.....	9 05 to 12 00	9 80 to 12 35
Wheat, No. 1 spring ..... per bushel..	1 50 to 1 52	1 63 to 1 64
No. 2 spring ..... do.....	1 47 to 1 49	1 60 to 1 62
winter, red, western ..... do.....	1 60 to 1 69	1 51 to 1 61
amber, western ..... do.....	1 70 to 1 75	1 62 to 1 72
white, western ..... do.....	1 70 to 1 85	1 75 to 2 00
Rye ..... do.....	73½ to 74	75 to 85
Barley ..... do.....	Nominal.	Nominal.
Oats ..... do.....	42½ to 48	35 to 49
Corn, new western, mixed ..... do.....	.....	.....
old western, mixed ..... do.....	63½ to 64½	64 to 64½
Hay, shipping qualities ..... per ton...	20 00 to 21 00	19 00 to 21 00
prime ..... do.....	24 00 to 31 00	26 00 to 30 00
Pork, mess ..... per barrel..	13 50 to 13 65	14 10 to 14 25
prime ..... do.....	10 50 to 11 00	10 50 to 12 50
Beef, plain mess ..... do.....	5 00 to 8 00	5 00 to 7 00
extra mess ..... do.....	7 00 to 10 00	7 00 to 9 00
Lard ..... per pound..	8 to 9¼	8½ to 9½
Butter, western ..... do.....	11 to 16	10 to 15
State dairy ..... do.....	20 to 26	20 to 26
Cheese, western dairy ..... do.....	9 to 12	12 to 13½
State factory ..... do.....	11 to 13	13 to 14½
Cotton, ordinary to good ordinary .... do.....	16⅛ to 19	17⅛ to 20¼
low middling to good middli'g .do.....	20⅝ to 23⅝	21⅛ to 24⅝
Tobacco, lugs, all grades ..... do.....	8½ to 9½	9 to 10¼
common to medium leaf .... do.....	9¼ to 10¾	10 to 11¼
Wool, pulled ..... do.....	30 to 65	.....
tub-washed ..... do.....	65 to 70	62½ to ———
California, spring clip ..... do.....	40 to 45	35 to 38
fall clip ..... do.....	20 to 33	.....
Texas, inferior to common .... do.....	18 to 43	.....

Market prices of farm products—Continued.

Articles.	August.	September.
BOSTON.		
Flour, western, superfine.....per barrel..	$5 00 to $5 50	$5 50 to $6 00
extras.....do.....	6 25 to 8 00	6 75 to 7 00
choice.....do.....	8 50 to 11 50	7 50 to 11 00
southern extras.....do.....	6 25 to 7 00	6 75 to 7 25
choice Baltimore.....do.....	10 00 to 11 50	9 50 to 12 00
Wheat.....per bushel..	1 60 to 1 80	1 50 to 1 85
Rye.....do.....	85 to 90	85 to 90
Barley.....do.....	75 to 1 10	75 to 1 10
Corn, southern yellow.....do.....	70 to 71	70 to 71
western mixed.....do.....	67 to 69	68 to 70
western yellow.....do.....	70 to 71	70 to 71
Beef, mess.....per barrel..	10 00 to 12 00	10 00 to 11 00
extra.....do.....	12 00 to 16 00	11 00 to 15 50
Pork, prime.....do.....	11 25 to 12 00	11 25 to 12 00
mess.....do.....	14 00 to 14 50	14 75 to 15 00
Lard.....per pound..	9 to 10	9 to 10
Butter, New York and Vermont.....do.....	18 to 27	15 to 28
Canada, choice.....do.....	22 to 25	22 to 25
western.....do.....	12 to 23	12 to 23
Cheese, N. Y. and Vt., choice factory..do.....	9 to 12½	13 to 14
Ohio, choice factory.....do.....	10 to 11½	11½ to 13½
Hay.....per ton...	20 00 to 31 00	20 00 to 29 00
Wool, Ohio and Pennsylvania.....per pound..	60 to 72	58 to 70
Michigan.....do.....	58 to 65	57 to 62
other western.....do.....	57 to 65	55 to 60
California.....do.....	25 to 55	25 to 32
Texas.....do.....	35 to 50	35 to 50
combing-fleece.....do.....	70 to 75	70 to 75
PHILADELPHIA.		
Flour, superfine.....per barrel..	4 75 to 5 50	4 50 to 5 50
extras.....do.....	5 50 to 6 25	5 75 to 6 25
family and fancy brands.....do.....	7 25 to 10 50	7 00 to 11 00
Wheat, red, Pa. and western.....per bushel..	1 65 to 1 70	1 62 to 1 72
amber.....do.....	1 70 to 1 88	1 75 to 1 82
Rye.....do.....	80 to ———	74 to ———
Corn, yellow.....do.....	62 to ———	66 to 67
mixed.....do.....	61 to ———	64 to 65
Oats, western white.....do.....	43 to 44	45 to 46
Pork, mess.....per barrel..	14 00 to 14 25	15 00 to ———
Beef, mess, city packed.....do.....	14 50 to 15 00	14 50 to 14 75
Lard.....per pound..	9 to 9¼	9 to 9¼
Cotton, middling.....do.....	21¾ to 22¼	22½ to 23
Hay.....per ton..	.....	36 00 to 45 00
BALTIMORE.		
Flour, superfine.....per barrel..	4 50 to 9 25	5 00 to 8 75
extra.....do.....	5 70 to 9 00	6 50 to 8 50
family and fancy.....do.....	8 25 to 12 50	9 00 to 12 00
Wheat, Pennsylvania.....per bushel..	.....	.....
western.....do.....	1 60 to 1 70	1 60 to 1 65
Maryland.....do.....	.....	.....
Rye.....do.....	60 to 70	75 to 85
Corn, yellow.....do.....	60 to 64	64 to 65
white.....do.....	72 to ———	67 to 68
Hay, western.....per ton...	34 00 to 35 00	34 00 to 38 00
Pa. and Maryland choice.....do.....	.....	40 00 to 42 00
Pork, mess.....per barrel..	14 50 to 14 75	15 00 to ———
Butter, western, prime to choice..per pound..	18 to 22	18 to 22
New York.....do.....	.....	.....

Market prices of farm products—Continued.

Articles.	August.	September.
BALTIMORE—Continued.		
Cheese, western factory ..... per pound..	$0 11 to $0 12½	$0 14 to $0 14¾
eastern factory ..... do.....	———	———
Lard..... do.....	8 to 10½	8½ to 10½
Cotton, ordinary ..... do.....	19½ to 19½	20 to ———
middling..... do.....	21½ to 21⅝	21 to 22½
Tobacco, common to good lugs ...per cental..	6 50 to 9 50	6 50 to 9 50
common to medium leaf ....do.....	10 00 to 12 00	11 00 to 12 50
Wool, unwashed, free from burs.....do.....	40 to 42	33 to 36
tub-washed ..... do.....	60 to 62	56 to 57
CINCINNATI.		
Flour, superfine..... per barrel..	5 25 to 5 75	5 75 to 6 50
extra ..... do.....	7 50 to 7 75	7 35 to 7 50
family ..... do.....	8 00 to ———	7 60 to 8 75
Wheat, No. 1 white..... per bushel..	1 60 to ———	1 65 to 1 70
No. 2 white..... do.....	1 55 to ———	———
No. 1 red ..... do.....	1 60 to 1 62	1 55 to 1 60
No. 2 red ..... do.....	1 60 to ———	1 50 to 1 55
Corn, white ..... do.....	52 to 53	48 to ———
yellow ..... do.....	———	46 to ———
Oats, white..... do.....	36 to ———	41 to ———
No. 1, mixed ..... do.....	33 to 34	32 to 35
Rye ..... do.....	73 to 75	65 to 73
Barley, winter, No. 2..... do.....	60 to 70	90 to 1 25
spring, No. 2 ..... do.....	60 to ———	———
Hay, timothy, new, com. to choice..per ton...	15 00 to 23 00	———
Pork, mess..... per barrel..	13 00 to 14 50	13 25 to 13 75
prime..... do.....	———	———
Beef, plate..... do.....	11 00 to 11 50	9 50 to 10 00
hams..... do.....	13 00 to 13 50	———
Lard, prime, steam..... per pound..	8¼ to 8⅜	8⅜ to 8¾
Butter, Western Reserve ..... do.....	20 to 22	20 to 22
choice Central Ohio..... do.....	18 to 20	———
Tobacco, lugs ..... do.....	10 to 18	10 to 18
leaf..... do.....	12 to 25	12 to 25
Wool, tub-washed ..... do.....	60 to 65	58 to 62
fleece-washed, manufacturing..do.....	55 to 60	48 to 52
fleece-washed, combing ..... do.....	65 to ———	———
unwashed, manufacturing.....do.....	40 to 45	36 to 40
unwashed, combing..... do.....	50 to ———	46 to 48
pulled ..... do.....	53 to 55	37 to 42
CHICAGO.		
Flour, winter, extra ..... per barrel..	7 50 to 10 50	8 50 to 8 75
spring, extra ..... do.....	6 00 to 7 75	5 00 to 6 75
Wheat, No. 1 spring..... per bushel..	1 33 to ———	1 27 to 1 29
No. 2 spring ..... do.....	1 31 to 1 32	1 22 to 1 23½
No. 3 spring ..... do.....	1 14 to 1 14½	1 15¼ to 1 16
Corn, No. 2..... do.....	42 to 42½	38¼ to 39⅓
rejected ..... do.....	39 to 39½	36½ to 37
Oats, No. 2 ..... do.....	27 to 27½	25 to 25¼
rejected ..... do.....	24 to 25	20 to 20⅓
Rye, No. 2 ..... do.....	60½ to 61	57 to 58½
Barley, No. 2..... do.....	50 to 55	47 to 48
Hay, timothy, (on track)..... per ton..	14 00 to 16 00	14 00 to 19 00
prairie ..... do.....	9 50 to 11 00	9 00 to 11 50
Pork, mess ..... per barrel..	14 00 to 14 12½	14 50 to 15 00
extra..... do.....	———	———
Beef, mess ..... do.....	9 00 to 10 00	9 00 to 10 00

Market prices of farm products—Continued.

Articles.	August.	September.
CHICAGO—Continued.		
Lard, per pound	$0 8½ to $0 8¾	$0 8¾ to $0 9
Butter, choice dairy, do	18 to 22	21 to 25
fair to good tub and firkin, do	13 to 15	14 to 18
Cheese, New York factory, do	11 to 12	13 to 14
Wool, tub-washed, do	60 to 70	60 to 67
fleece-washed, do	35 to 54	40 to 58
unwashed, medium, do	40 to 43	36 to 40
SAINT LOUIS.		
Flour, superfine, per barrel		4 25 to 4 75
extras, do	6 90 to 7 75	5 00 to 6 65
choice, do	8 50 to 9 50	7 00 to 9 50
Wheat, red, per bushel	1 25 to 1 70	1 32 to 1 75
white, do	1 40 to 1 75	1 40 to 1 80
spring, do		1 10 to 1 37
Corn, mixed, do	39 to 49	33 to 45
yellow, do		36 to ———
white, do	50 to ———	46 to 47
Oats, white, do	39 to ———	31 to 32½
mixed, do	26½ to 38	21 to 30
Rye, do	60 to ———	54 to 57
Barley, winter, do	Nominal.	
spring, do	Nominal.	40 to 60
Hay, per ton	14 00 to 21 00	14 00 to 22 50
Pork, mess, per barrel	13 50 to 13 75	14 75 to 15 00
Lard, prime steam, per pound	9 to 10	9 to 10½
kettle, do		
Butter, choice, do	18 to 24	20 to 22
medium to fair, do	12 to 16	16 to 18
Cheese, choice factory, do	10½ to 11	12½ to 13½
Cotton, middling, do	21½ to 22	21½ to 22
Tobacco, lug, per cental	7 50 to 9 00	8 00 to 9 25
common leaf, do	8 50 to 9 50	9 00 to 9 75
medium to good leaf, do	9 50 to 10 50	10 00 to 11 00
Wool, tub-washed, per pound	55 to 60	50 to 58
fleece-washed, do	50 to 60	45 to 48
unwashed medium, do	41 to 43	33 to 37
NEW ORLEANS.		
Flour, superfine, per barrel	5 25 to 5 50	5 75 to 6 00
extras, (according to grade), do	5 75 to 12 50	6 40 to 10 00
Corn, white, per bushel	56 to 57	60 to 62
yellow, do	58 to ———	58 to 60
mixed, do	66 to 68	55 to 60
Oats, do	42 to 46	32 to 40
Hay, choice, per ton	24 00 to 25 00	28 00 to 30 00
prime, do	26 00 to 27 50	27 00 to 28 00
Pork, mess, per barrel	13 75 to 14 00	14 50 to 15 25
Beef, mess, (Texas), do	11 00 to 12 00	11 00 to 12 00
Lard, tierce, per pound	9¼ to 9¾	10 to 12
keg, do	10¾ to 11½	12½ to ———
Butter, choice western, do	17 to 20	18 to ———
Goshen, do	30 to ———	30 to ———
Cheese, choice factory, do	14 to 15	12 to 13
western reserve, do		
New York cream, do	16 to ———	16 to ———
Cotton, ordinary to good ordinary, do	18½ to 19¼	18⅞ to 19⅜
middling to good middling, do	19⅜ to 20½	20⅜ to 21⅛
Tobacco, lugs, do	8½ to 9½	8½ to 9½
low-leaf, do	9½ to 10½	9½ to 10½
medium, do	10½ to 11½	10½ to 12½

Market prices of farm products—Continued.

Articles.	August.	September.
SAN FRANCISCO.		
Flour, superfine.....per barrel..	$4 00 to $4 50	$4 00 to $4 25
extra superfine.....do.....	4 75 to 5 00	4 40 to 4 50
higher grades.....do.....	5 25 to 6 00	4 75 to 5 75
Wheat, State.....per cental..	1 50 to 1 65	1 45 to 1 55
Oregon.....do.....	1 60 to 1 65	1 50 to 1 55
Corn, white.....do.....	1 60 to 1 65	1 70 to 1 75
yellow.....do.....	1 55 to 1 60	1 60 to 1 65
Hay, State.....per ton..	9 00 to 15 00	9 00 to 16 00
Pork, mess.....per barrel..	17 00 to 20 00	17 00 to 20 00
prime mess.....do.....	.....	17 50 to 18 00
Beef, mess.....do.....	12 00 to 14 00	12 00 to 13 00
Lard.....per pound..	10 to 11¾	10½ to 11½
Butter, overland.....do.....	18 to 20	22½ to 25
California.....do.....	25 to 30	25 to 37½
Oregon.....do.....	15 to 18	29 to ———
Cheese.....do.....	10 to 15	10 to 15
Wool, native.....do.....	20 to 30	12 to 25
California.....do.....	35 to 37½	30 to 37½
Oregon.....do.....	35 to 40	35 to 38